



2010 ANTHROPOMETRIC SURVEY OF U.S. MARINE CORPS PERSONNEL: METHODS AND SUMMARY STATISTICS

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EXECUTIVE SUMMARY

The Natick Soldier Research, Development and Engineering Center (NSRDEC) conducted a comprehensive anthropometric survey of U.S. Marines (MC-ANSUR), between September 2009 and August 2010. The project was funded by the U.S. Marine Corps Systems Command. Goals of the survey were to acquire a large body of data from comparably measured males and females to serve the Marine Corps' current design and engineering needs, as well as those anticipated well into the future and to assess the changes in the body sizes of Marine personnel since the last large-scale survey was conducted in 1966 by comparing these statistics to those from 1966.

Ninety-four directly measured dimensions, 41 derived dimensions, and three-dimensional (3-D) head, foot, and whole-body scans were obtained in this study. The sample consisted of 1301 men and 620 women, who were measured between May 5 and September 23, 2010. Data were collected in terms of the racial/ethnic, gender, age, geographic, and occupational distribution of the participants.

The impetus for this survey was the concern that Marine body size and shape had changed since the last USMC survey in 1966 and since a matched sample Marine database had been created from Army data in 1994. To the extent that the current anthropometry is different from those previous databases, equipment and workspaces might not be optimized. This study showed that female Marines had increased in weight and some weight-related circumferences since 1994, while becoming no taller. Male Marines increased in size for all the compared dimensions from 1966 to 2010, and increased for weight and weight-related circumferences since 1994. Current male Marines had increased in stature (height) compared to 1966 Marines, but not compared to 1994 Marines.

The design implications from the survey were seen primarily at the upper end of the body size distribution. The upper accommodation limit—typically the male 95th percentile—increased 2-3 cm for buttock circumference, chest circumference, and waist circumference. At a minimum, the effects of these increases will be seen in tariffs for clothing and protective equipment, where a greater proportion of the larger sizes will be needed.

2010 ANTHROPOMETRIC SURVEY OF THE U.S. MARINE CORPS PERSONNEL: METHODS AND SUMMARY STATISTICS

CHAPTER I

INTRODUCTION

This report contains results of an anthropometric survey of U.S. Marines completed between September 2009 and August 2010 by the Natick Soldier Research, Development and Engineering Center (NSRDEC). The project was sponsored by the U.S. Marine Corps Systems Command.

All U.S. military services and many foreign militaries compile and maintain extensive collections of body-size information used primarily to guide design and sizing of clothing, personal protective equipment, work stations, and computer-generated digital human models. To be effective, such a database must be updated periodically to accurately reflect the body sizes and proportions of the military population it represents.

The last anthropometric survey of U.S. Marine Corps (USMC) men was conducted in 1966 (White and Churchill, 1977), 44 years, or the equivalent of several military generations, ago. A substantial proportion of the sample was young (88% under 25 years old), and 78% of the subjects were white. By comparison, today's male Marines are older and more racially diverse.

Today, women make up 6.8% of active U.S. Marine Corps personnel, and with each passing year, more jobs are filled by women. This means that clothing, protective equipment, and workspaces, originally sized and designed to accommodate only males, must be modified and redesigned to accommodate the larger variations represented by an integrated male/female population.

After a U.S. Army anthropometric survey (ANSUR) was completed in 1988, the Marine Corps decided to leverage the Army data through statistical matching procedures rather than conduct an extensive full scale anthropometric survey of its own. To this end, a USMC "mini-survey" was undertaken in the summer of 1994 wherein 470 female and 493 male Marines were measured for height, weight, and 10 other body dimensions representing all major body segments. The height and weight data from the 1994 USMC mini-survey were used with USMC sex/age/race census data to calculate subject weights for male and female participants in the Army survey that would then statistically match sex-specific USMC age/race/height/weight distributions (Donelson & Gordon, 1996). The other 10 body dimensions directly measured in the 1994 USMC mini-survey were used to validate the relative success of the matching technique, and statistically weighted data from the 1988 ANSUR survey was subsequently used for USMC design and sizing applications.

In 2006, amid concerns that the Army's database no longer adequately represented the Army, a pilot study was undertaken to determine whether a new

anthropometric survey was needed. The results of that study (Paquette et al., 2009) indicated that the Army had not only changed in overall body size, but in body proportion as well. This led to concern that such changes had also occurred over time in the Marine Corps, although not necessarily in the same ways. In any case, continued use of statistically weighted data from a 1988 Army survey seemed no longer appropriate. The USMC Project Manager, Infantry Combat Equipment (PM-ICE) decided to conduct a full-scale USMC anthropometric survey, and approached the NSRDEC in 2009 to undertake the study.

A comprehensive body-size study of USMC men and women was undertaken in 2010 to correct these deficiencies, and to provide new data that were previously unavailable. The goals of this anthropometric survey (MC-ANSUR) were to acquire a large body of data from comparably measured males and females to serve the Marine Corps' current design and engineering needs, as well as those anticipated well into the future. A specific innovation added to address future needs was the addition of three-dimensional (3-D) scans of the head, the foot, and the whole body. These scans provide geometric and morphological data of the human body that cannot be gathered using traditional body measurements alone.

Six months of planning preceded the survey. During this time, candidate dimensions were reviewed for relevance, replicability, and comparability to arrive at the final selection, which included 94 directly measured dimensions and 41 derived dimensions. Summary statistics for these traditional measurements, including percentile and frequency tables, are reported in this volume. Whole body, head, and foot scans were also taken for each measured individual, though they are not included in this volume.

1.1 SELECTION OF SURVEY DIMENSIONS

The list of dimensions was developed from the 1987-1988 ANSUR, the U.S. military's most comprehensive anthropometric survey. A team of government and contractor scientists evaluated each dimension on the list, assessing its usefulness for USMC needs. Dimensions that have not proved useful were dropped. Dimensions that could reliably be estimated from other measured dimensions were also dropped. Dimensions that would have been useful, but were not measured in ANSUR, as well as a few additional dimensions recommended by international standards, were added.

After the dimension list was established, the specific definition for each dimension was reviewed. In general, the ANSUR definitions were used, both because they were well defined in 1987, and because a consistent definition would allow comparisons between newly collected data and historic data. However, a few definitions were modified. In some cases, the modification simply improved the clarity of the original ANSUR definition. In other cases, the new definitions reflected international standards. Finally, some changes were necessary due to changes in human physique over the decades. In every case where a definition in this report differs from the ANSUR definition, it is noted in the dimension description.

The final dimension list includes dimensions that can be used in many different applications. Appendix A shows seven categories of uses (e.g., clothing design, workstation design, human analog design) and identifies which of the 94 measured dimensions and 41 derived dimensions are most useful for meeting those needs.

1.2 OVERVIEW OF THE SAMPLE

The Marine participants were chosen using a rostering method to obtain an appropriate mix of ages, racial/ethnic backgrounds, and sex. Chapter III and Appendix B provide more details of the sampling strategy. Tables 1 and 2 provide an overview of the MC-ANSUR database by age, race/ethnicity, and gender.

TABLE 1

Racial/Ethnic Distribution of the MC-ANSUR Participants

Race/Ethnicity	Males		Females	
	Frequency	Percent	Frequency	Percent
White	764	58.72	334	53.87
Black	117	8.99	81	13.06
Hispanic	181	13.91	101	16.29
Asian or Pacific Islander	34	2.61	12	1.94
Native American	11	0.85	6	0.97
Other (Asian Indian)	4	0.31	0	0.00
Two groups	177	13.60	76	12.26
More than two groups	11	0.85	9	1.45
Unknown	2	0.15	1	0.16
Total	1301	100.00	620	100.00

TABLE 2

Percentages of the MC-ANSUR Participants by Age Group and Racial/Ethnic Category

Age Group	White	Black	Hispanic	Asian/Pacific Islander	Native American	Other (Asian Indian)	More than One Group	Unknown	Totals
Males									
≤ 20	15.99	1.54	4.07	0.54	0.31	0.08	4.23	0.00	26.76
21-25	28.13	3.46	6.15	1.00	0.46	0.08	6.46	0.08	45.82
26-30	7.76	1.77	2.15	0.85	0.00	0.15	1.84	0.08	14.6
31-40	5.30	1.69	1.08	0.23	0.08	0.00	1.54	0.00	9.92
≥ 41	1.54	0.54	0.46	0.00	0.00	0.00	0.38	0.00	2.92
100.0									
Females									
≤ 20	14.52	3.23	5.16	0.48	0.16	0.00	4.03	0.16	27.74
21-25	28.39	5.00	6.94	0.81	0.65	0.00	6.77	0.00	48.56
26-30	5.97	2.42	1.77	0.32	0.16	0.00	2.10	0.00	12.74
31-40	4.19	1.61	2.10	0.32	0.00	0.00	0.81	0.00	9.03
≥ 41	0.81	0.81	0.32	0.00	0.00	0.00	0.00	0.00	1.94
100.0									

1.3 HOW TO USE THIS REPORT

The landmarks used to define the origin and termination of the measurements made in this survey are listed and briefly described in Chapter II. That chapter also summarizes the operational aspects of the survey and includes descriptions, illustrations, and sources of the instruments used. A full explanation of the sampling strategy appears in Chapter III and Appendix B; Chapter III also includes a number of tables that describe the demographic character of the MC-ANSUR database.

The anthropometric data in this report are given in Chapters IV and V, which include summary statistics and descriptions of the body measurements and the derived measurements, respectively. Each dimension is described and illustrated. Summary statistics are reported separately for males and females. Visual indices designed to help readers identify and locate those dimensions by their anthropometric designations appear in Appendices C (measured) and D (derived). Users should note that the body positions represented in the visual indices are approximate. To confirm exact body positions and measurement procedures for the body measurements, users should consult the specific dimension descriptions in the Measurer's Handbook (Hotzman et al., 2011). Appendix E contains a brief explanation of the summary statistics used to report the measurement data in Chapters IV and V. Chapter VI presents comparative data showing the changes in body size and shape of Marine Corps personnel that have occurred over the past five decades.

Chapter VII discusses 3-D scanning equipment, landmarks, and scan protocols, and Chapter VIII details the procedures developed to minimize observer error throughout the duration of the survey.

For users familiar with the original numbers assigned to dimensions in the 1988 ANSUR survey, a cross-reference table is provided in Appendix F linking MC-ANSUR dimension numbers to those of comparably measured dimensions from ANSUR. This table can also be used as a quick reference to determine which of the ANSUR dimensions were identically defined in the current survey and which dimensions were modified. An assessment of the comparability of measurements obtained in this survey with measurements from other major anthropometric surveys appears in tabular form in Appendix G. A copy of the demographic/biographical form completed by each Marine is located in Appendix H. Finally, a glossary of anatomical and anthropometric terms (Appendix I) and an index are included to further help the reader understand the terminology used in this report and to locate dimensions of interest quickly.

CHAPTER II

THE SURVEY

2.1 PARTICIPANT PROCESSING AND MEASURER TRAINING

The survey team visited three Marine Corps installations during a 5-month period to collect body measurements and 3-D scans. Considerable advance planning took place both at Anthrotech and at NSRDEC. In preparation for assembling a measuring team, project personnel prepared a training manual designed to serve as the primary instructional guide for members of the team (Hotzman et al., 2011). This handbook contained detailed written and illustrated instructions for marking and measuring participants, and explained the operation and maintenance of the whole-body, head, and foot scanners.

A streamlined procedure was devised for measuring approximately 50 participants a day. The measurements were divided into four manageable groups, based on principles of time and motion efficiency. Dimensions assigned to a given measuring station were those that could most easily be measured in sequence without excessive repositioning of participants and those that required a minimum of instrument handling. Dimensions were also grouped in such a way that the time required to measure all dimensions at each station was approximately equal. Two landmarking stations were similarly established, as were in- and out-processing stations. Figure 1 illustrates the plan for flow of participants through the process.

In the meantime, NSRDEC and USMC personnel made all the necessary arrangements at Marine Corps installations where measuring teams were to work for periods ranging from 3 weeks to 2 months. The itinerary was as follows:

Quantico, Virginia – May 5, 2010 – May 25, 2010

Camp LeJeune, North Carolina – June 3, 2010 – June 29, 2010

Camp Pendleton, California – July 14, 2010 – September 27, 2010

In April 2010, a measuring team of 21 people began an intensive 4-week training period prior to their deployment in the field. Early in the training period, team members were assigned to one of the stations—landmarking, measuring, scanning, and demography—at which they would work. Thus, each team member, under the instruction of professional anthropometrists, concentrated for about 3 weeks on learning to locate and draw the landmarks or measure the dimensions for which he or she would be subsequently responsible.

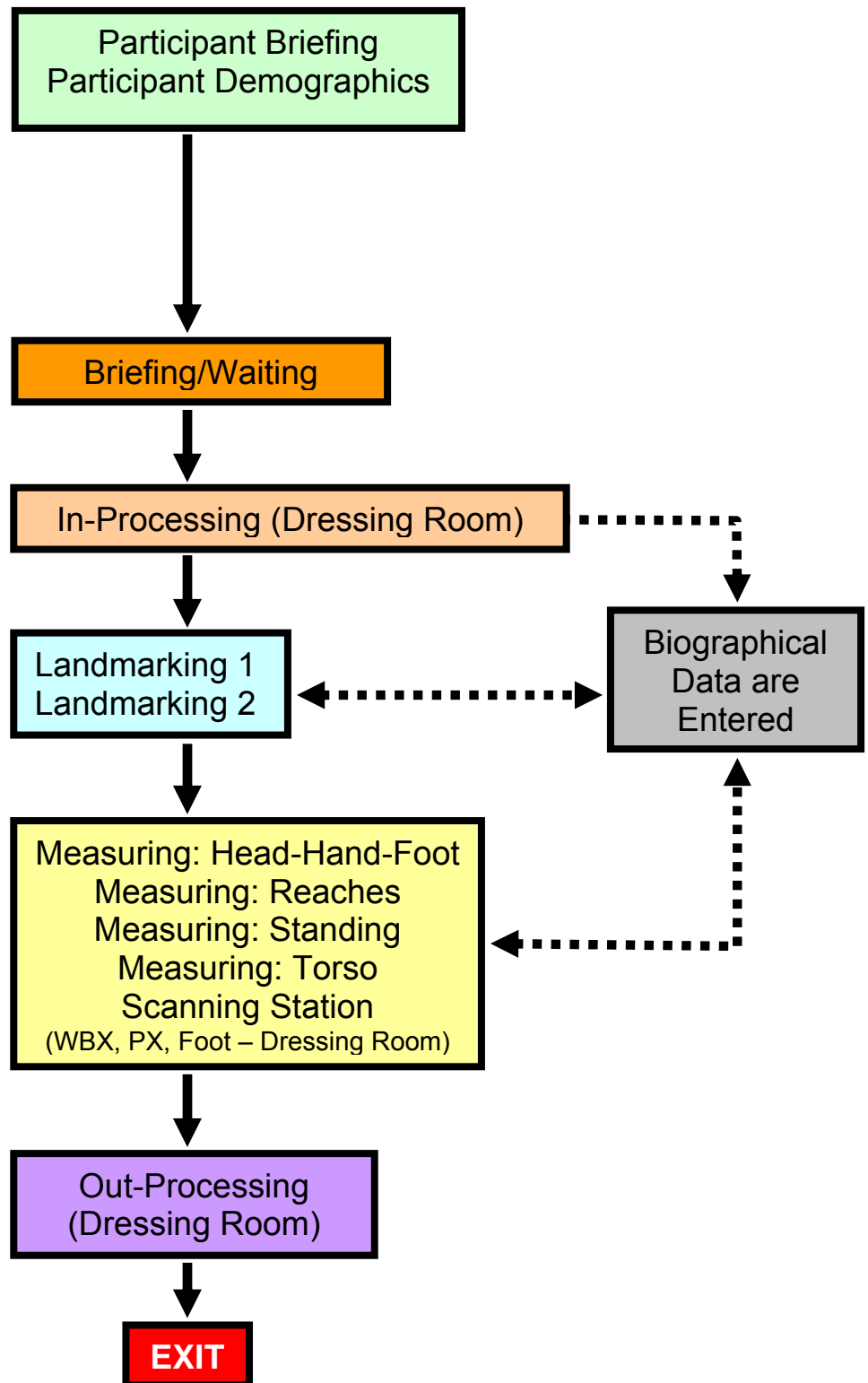


FIGURE 1
Participant Flow

Two people were assigned to each measuring station: one to serve as a measurer and one as a recorder; pairs of team members alternated these functions throughout each day. Two women were permanently assigned to two of the measuring stations, Reaches and Standing, and two men were permanently assigned to the Head, Hand, and Foot measuring station. Depending on whether participants were men or women, a male team alternated with a female team at the remaining station, Torso, where most dimensions between the waist and knees were measured. These same teams alternated assignments to the out-processing station. Male and female marking personnel at the landmarking stations also changed from day to day, depending on whether participants were men or women. They alternated as in-processors when members of the opposite sex were being marked.

When Marines arrived at the measuring site, they were briefed on the general purposes of the survey by a Government representative, and filled out machine-readable forms giving demographic and biographical information about themselves (see Appendix H). After the participants completed the biographical forms, an Anthrotech employee briefed the Marines on the specific landmarking, measurement, and scanning procedures to be conducted. After the briefing, all Marines were given nylon tricot track shorts (see photos in Chapter IV) in which they were measured. Men were measured bare-chested. Women were measured in their own bras, unless they requested a jog bra—a cotton spandex sports bra with racer back design. Both were issued tank tops to wear while moving around between measuring stations and at stations where upper body exposure was not required. When participants reached the whole-body scanning station, they changed again into mid-thigh-length nylon spandex compression shorts (see Figure 26 in Section 7.1). Women who had been wearing their own bras changed into the cotton spandex sports bras.

While the Marines were changing into the track shorts prior to beginning the measuring process, the demographic forms were fed through a form reader, and the scanned data were transferred to the demographic station. As the Marines moved through each of the measuring stations, one stop was the demographic station where an Anthrotech employee verified the entered information. Typically this occurred while the participant was waiting for one of the measuring or scanning stations to become available. After demographic data verification, the forms were shredded to protect the participants' privacy.

2.2 COMPUTER PROCEDURES

One feature that distinguishes this survey from its predecessors is the use of networked laptops for data entry in the field. Networked computers were used for three reasons:

- Entering the data onto electronic media allowed the data to be ready for analysis quickly and eliminated transferring handwritten data as a source of error. The network made it possible for the data from each station to be assembled and sent daily to Anthrotech, from which they were forwarded to a NSRDEC server.

- The computers were equipped with proprietary software that reviewed data values as they were entered (see Section 2.3). If a questionable value was identified by the software, the measurers could check it while the participant was still present. Thus, the data coming in from the field contained fewer errors of measurement or entry and fewer questionable values about which the data editors had to make decisions.
- A final field data check was carried out at the out-processing station, where input dimensions from all stations were available for use in calculating regression estimates.

Barcodes representing subject numbers were pre-printed on each demographic form. This eliminated the possibility of duplicate participant numbers. As each Marine completed his or her demographic form, that barcode was scanned at the in-processing station, entering that participant into the data management system with an associated subject number but no personally identifiable information. At that time, the in-processing station printed out measurement forms for each of the four measuring stations. These forms—unique to each Marine—were also imprinted with the participant's bar-coded subject number.

Laptop computers were used at each measuring station. When a Marine arrived at a measuring station, the barcode was scanned into that laptop, so that the participant's data could be associated with his or her data from each of the other stations. As each participant was measured, the recorder entered the data into the station's computer. The recorder also manually recorded the measurements on the data forms as a back-up. At the scanning station, the operators also scanned the barcode on the demographic form. The participant number was then incorporated into the image file name generated by each of the scanners. After the participant was measured and scanned, a team member at the out-processing station checked to verify that the participant had been processed at each of the previous stations. The barcode was scanned a final time to remove the participant from the list of "in-process" participants.

2.3 COMPUTER EDITING ROUTINES

The editing routines in the computer software were based on procedures that had been used successfully by the contractor in a number of previous military surveys. The approach is essentially two-phased. A value is first checked against the highest value and the lowest value measured for that variable. If the measured value is higher than the highest value to date or lower than the lowest value to date, a notification is given that instructs the measurer to take the measurement again. The software does not allow the measurer to continue until the measurement has been re-taken or an explanation is given as to why that value is correct (e.g., short torso, very long legs). This approach is very effective in screening out wildly aberrant values resulting from misassembling an instrument, misreading an instrument, transposing digits, or misentering a value by 100 or 1000.

After all dimensions at a given station were measured, the second phase of data editing began. The computer software contained a series of multiple regression equations in which the value for each dimension was predicted from the values of two other dimensions at that station. The measured value for a given participant, for a given dimension, was compared to the predicted value. If the measured and the predicted values differed by more than a preset amount, the measurer was asked to re-measure that dimension, as well as the associated dimensions from the regression. In that way, values which were not aberrant for the population as a whole but were disproportionate for that individual were identified and checked. The original version of the computer data entry and editing system, including program source code listing, is completely described in Churchill and coworkers (1988).

2.4 ANTHROPOMETRIC AND LANDMARKING INSTRUMENTS

The instruments used for measuring the body in this survey were the following:

Anthropometer	Poech sliding caliper
Beam caliper	Pupillometer
Foot scanner	Scale (weighing)
Head scanner	Sliding caliper
Holtain caliper	Spreading caliper
Modified beam caliper with dowel	Steel tape
Modified Brannock device	Wall chart
Modified height gauge	Whole-body scanner
Modified steel tape	

Standard anthropometric instruments are made by GPM, Switzerland and by Holtain LTD, Great Britain. Seritex, Inc., 1 Madison Street, East Rutherford NJ 07073 (www.seritex.com) is the US distributor for both companies. The steel tape measure is a Lufkin Executive Diameter metric tape measure (W606PM) manufactured by Cooper Hand Tools and available from online retailers at www.cooperhandtools.com.

These instruments are illustrated below in Figures 2 through 8.

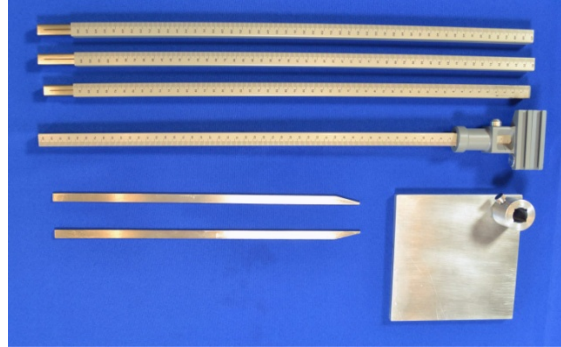


FIGURE 2

Anthropometer: Assembled and in Parts



FIGURE 3

Beam Caliper

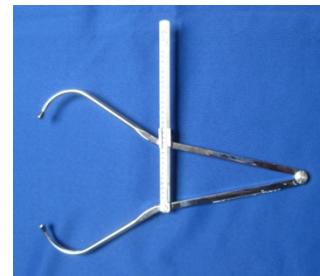


FIGURE 4

Spreading Caliper



FIGURE 5

Sliding Caliper



FIGURE 6

Holtain Caliper

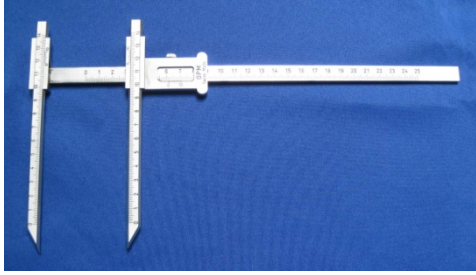


FIGURE 7

Poech Sliding Caliper



FIGURE 8

Steel Tape

The anthropometer is the basic tool of the anthropometrist and is used to measure all linear dimensions. The bottom portion of the anthropometer is detachable for use in measuring heights from a standing surface to the lower parts of the body, or from a sitting surface to the head or upper body parts of a seated participant. The detached upper half forms a beam caliper to measure breadths, depths, and body segment lengths. The smaller sliding, spreading, Holtain, and Poech sliding calipers were used primarily for measuring dimensions of the head, face, and hands. The steel tape was used to measure body circumferences and arcs.

A battery-operated digital scale, manufactured by Seca, was used for measuring body weight (Figure 9). It is widely available through a number of online retailers.



FIGURE 9

Scale

A digital read-out Hoya pupillometer, using the corneal reflection/hairline alignment method, was used to measure interpupillary distance (Figure 10). This pupillometer can be ordered online from www.GetOptic.com.

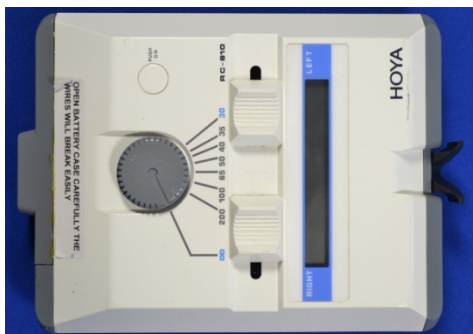


FIGURE 10

Pupillometer

Measuring instruments that were modified or created for the survey included: foot measuring devices, a modified Vernier height gauge, a wall chart, a modified steel tape, and a beam caliper modified to include a dowel on the fixed blade.

The foot measuring devices were a Men's Brannock Device size 4-16/width 3A-3E (used for both men and women) and a Pro Series Brannock Device size 10-25 (used for large sizes); both were modified with a Kreg Model KMS729 L-R reading metric measuring tape (Figure 11). These materials can be obtained from The Brannock Device Company, Inc., 116 Luther Avenue, Liverpool NY 13088 (www.brannock.com) and Kreg Tool Company, 201 Campus Drive, Huxley IA 50124 (www.kregtool.com). The Brannock device facilitates positioning and measuring of the foot.

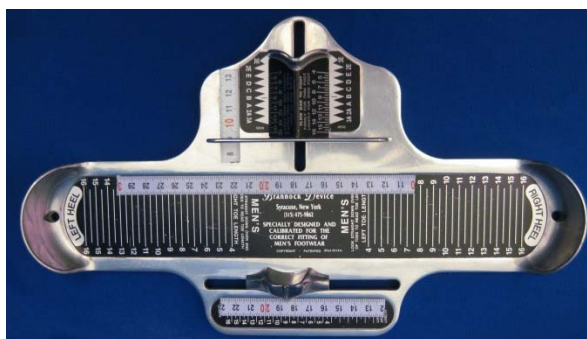


FIGURE 11

Modified Brannock Device

A standard metric Vernier height gauge was modified (Figure 12) for use in measuring Lateral Malleolus Height and Acromion-Wall Depth. The metal base was replaced with a wooden base, and its carbide tip was blunted. A similar model (Series H04, Id: 161-103k) can be obtained at the Tresna On-Line-Store (www.tresnainstruments.com).

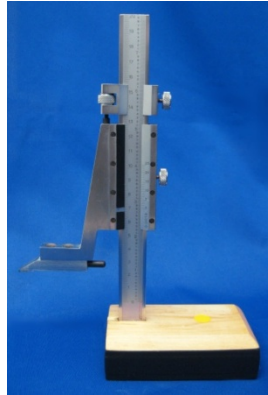


FIGURE 12

Modified Height Gauge

A wall chart made of drafting mm graph paper sealed in Mylar sheeting (Figure 13) was used to measure Thumbtip Reach and Span. The graph paper is marked at 5 cm and 10 cm intervals. This graph is 230 cm wide. It is placed 50 cm from an adjacent wall, which serves as the back plane for the measurements.

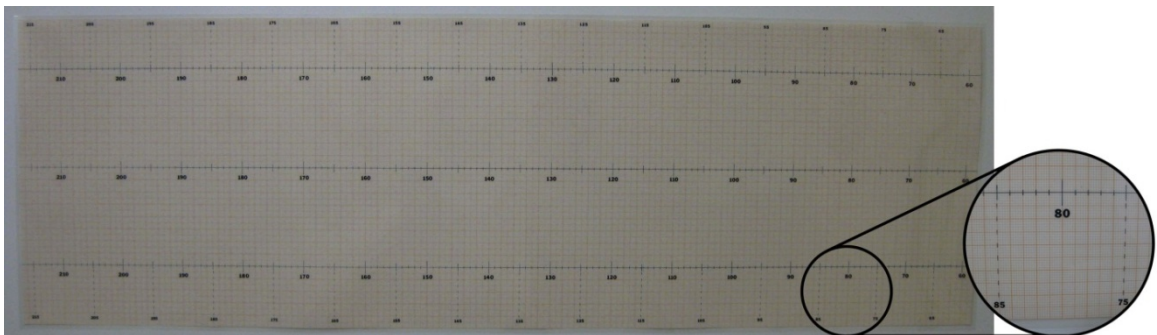


FIGURE 13

Wall Chart

The modified steel tape, used for Crotch Length, Posterior (Omphalion), was made by attaching a dowel (5" long by 1/4" in diameter) to the zero end of the standard steel tape as a hand hold (Figure 14). A 2-cm triangular plastic pennant was affixed at the 0 mark of the tape.

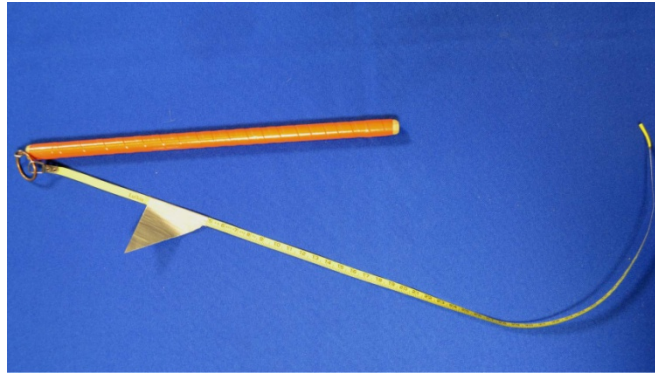


FIGURE 14

Modified Steel Tape

A beam caliper was modified with a 1-1/4-inch diameter wooden dowel and was used for measuring Forearm-Center of Grip Length (Figure 15). The measuring blade was inserted into the dowel so that the calibrated edge was located in the center of the dowel.

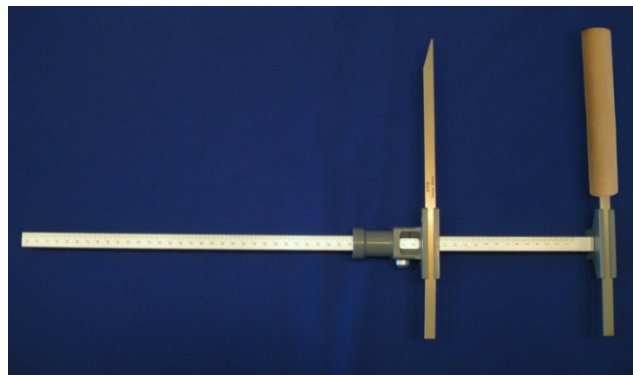


FIGURE 15

Modified Beam Caliper with Dowel

A number of marking aids were used in this study, including a landmark transfer rod (Figure 16) and a scye marking aid (Figure 17). The base of the landmark transfer rod has five casters on the bottom to permit the device to be easily rolled around the participant. A slide that can be moved up and down is mounted on the vertical rod. The device is used to transfer landmarks from one side of the body to the same level on the other side. The dimensions of the landmark transfer rod are as follows:

Total height = 184 cm

Pentagonal base measuring 21 cm on each of the five sides

Arm length = 34 cm

Arm end width = 35 cm

Rod diameter = 1.85 cm
Wheel circumference = 15.8 cm
Ground to base height (bottom) = 6.2 cm
Ground to base height (top) = 6.8 cm
Base thickness = 1.9 cm
Square base on pentagonal base = 20 cm x 20 cm



FIGURE 16

Landmark Transfer Rod

The scye marking aid is a rigid Plexiglas straight edge 480 mm long, 35 mm wide, and 3 mm thick. A line level was epoxied to the lower left margin of the straight edge. This device is used to establish the anterior and posterior scye marks.

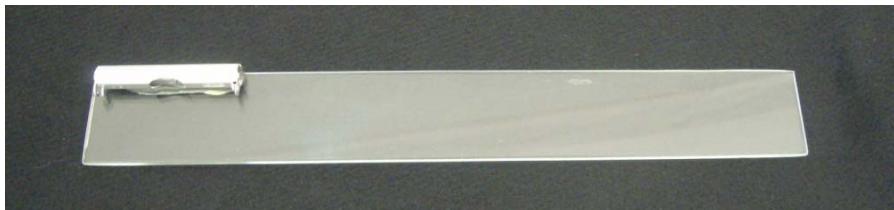


FIGURE 17

Scye Marking Aid

2.5 THREE-DIMENSIONAL SCANNERS

The whole-body scanner (WBX), head scanner (PX), and foot scanner are low-power laser systems (Figures 18, 19, and 20, respectively) that are completely safe for human use. The WBX and PX were government furnished property obtained from Cyberware, Inc., 2110 Del Monte Avenue, Monterey, California 93940. After USMC data collection was complete, Cyberware ceased operations, so these scanners are no longer available for purchase. The INFOOT foot scanner is available from I-Ware Laboratory, MINOH Furures Bldg. 5F, 1-10-9, Senba-Higashi, MINOH-City, Osaka 562-0035 Japan. Each of these scanners records surface images of the body to capture the overall morphology of the participants. Scanning in each of the scanners takes approximately 15-20 seconds to complete. The software for participant scanning, CyScan for the whole-body and head scanners, and INFOOT for the foot scanner, run on the Windows XP operating system. Each scanner had a separate computer attached that was solely responsible for collecting that scanner's data. CyScan software on the WBX ran in conjunction with the Enhanced Anthropometric Rating System (EARS) Program. EARS, developed by Arizona State University under contract to NSRDEC, was used as an evaluation step to assist the operator in gathering high quality scans. Scan data files from each scanner were transferred over a local network via Ethernet data cable connection to the system server. In addition to the daily uploads of all survey data to the NSRDEC server, the scan data and traditional measurement data were backed up daily onto a DVD. Detailed instructions for operating each of these scanners can be found in the Measurer's Handbook (Hotzman et al. 2011).

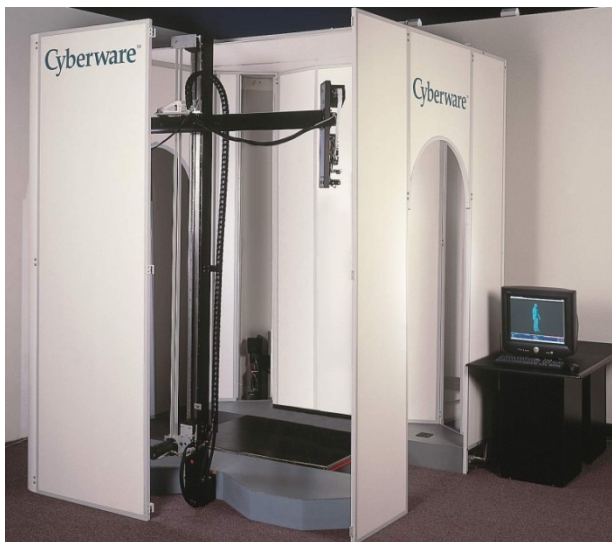


FIGURE 18

WBX



FIGURE 19

PX



FIGURE 20

Foot Scanner

2.6 THE LANDMARKS

Dimensions are measured from one point on the body (or a fixed surface such as the floor) to another or, in the case of circumferences, around a part of the body at a specified level. To ensure that each dimension is measured accurately and consistently from participant to participant, dimensions are defined in terms of body landmarks, which serve as the origin, termination, or level of measurement of a dimension.

Two men and two women were trained in locating, by palpation or by sight, the points to be marked, and in placing actual drawn marks on the bodies of all participants in this survey. Measurers were also trained to recognize other easily located landmarks such as Dactylion III, the tip of the middle finger, for which marking was not necessary.

The landmarks used to define the measurements in the survey are listed and briefly described on the following pages. Detailed instructions for locating these landmarks can be found in the Measurer's Handbook (Hotzman et al., 2011). The definition of some of these landmarks has changed from the previous survey of U.S. Army personnel (ANSUR) (Gordon et al., 1989) on which the current survey was modeled, although the names remain the same. These changes are summarized below.

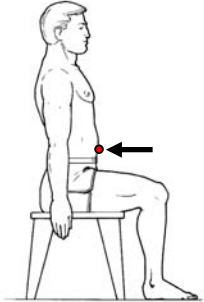
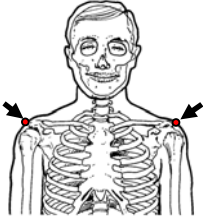


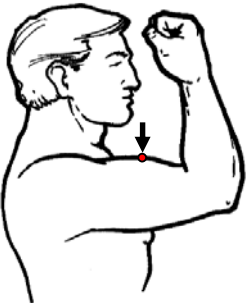
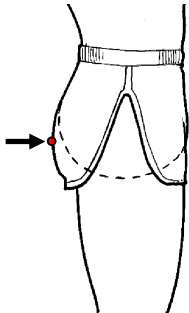
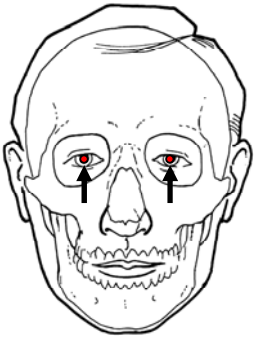
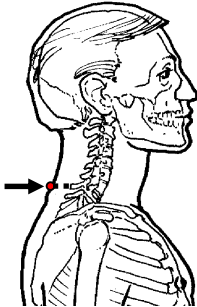
A total of four landmarks from the original ANSUR survey were modified in the MC-ANSUR survey. The first was cervicale. The cervicale landmark was located at the "superior palpable point" of the spine of the seventh cervical vertebra in the ANSUR survey. This was changed to "most prominent point" in the current survey in order to bring the definition into compliance with standard anatomical usage (Martin, 1914) and international practice (ISO 7250-1). Typically the distance between the two landmarks is not more than 1 or 2 mm, with the new definition usually producing the lower mark.

A second modification occurred in the use of a MC-ANSUR landmark called chest point, anterior. In ANSUR this landmark was named bustpoint/thelion, and

referred to the most anterior point on the bust, for females and the center of the nipple (thelion) for males. The definition of this landmark remains unchanged in the current survey for female participants, although the name has been changed to chest point, anterior. Now, chest point, anterior is used for both males and females. The change from thelion to chest point, anterior was made to ensure that measurements were made at the largest portion of the chest (regardless of nipple location), which is required for determining clearance as well as for clothing and protective gear. For some males—those with relatively flat chests—there is no practical difference between the two landmarks. For those with heavier chest development, the new landmark will produce a larger Chest Circumference and Chest Dept, and produce a higher Chest Height.

Deltoid points, right and left, are used to establish the level at which Shoulder Circumference is measured. On heavier participants, the previous ANSUR definition at the “lateral point of the deltoid muscle” results in a Shoulder Circumference measurement that is too low to be useful for clothing design. The definition for the deltoid landmarks were thus changed to the midpoint of the right and left deltoid muscles. For most individuals, there will be no change in Shoulder Circumference as a result of the landmark change. For heavier individuals, Shoulder Circumference will be somewhat smaller.

The final modification was a name change for orbitale. This landmark was previously termed “infraorbitale” in ANSUR. The change to orbitale was made to bring the nomenclature into compliance with traditional anatomical usage (Martin, 1914) and standard international practice (ISO 7250-1).

LANDMARKS	
<p>Abdominal point, anterior: The most protruding point of the relaxed abdomen on a sitting participant.</p> 	<p>Acromion, right and left: The point of intersection of the lateral border of the acromial process and a line running down the middle of the shoulder from the neck to the tip of the shoulder.</p> 
<p>Acropodion: The tip of the first or second toe of the right foot, whichever is longer.</p> 	<p>Axillary fold, posterior: right and left: The highest points of the right and left axillary folds on the back.</p> 
<p>Biceps point: The highest point of the right flexed biceps brachii muscle as viewed from the participant's right side.</p> 	<p>Buttock point, posterior: The point of maximum protrusion of the right buttock of a standing participant.</p> 
<p>Center of pupil, right and left: The center of the pupil of the eye.</p> 	<p>Cervicale*: The most prominent palpable point of the spine of the seventh cervical vertebra.</p> 

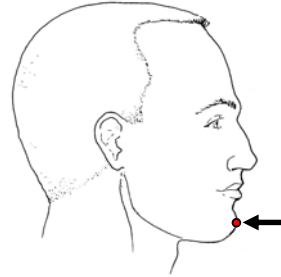
*Change from ANSUR. See page 17 for details.

LANDMARKS Continued

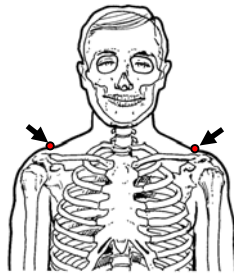
Chest point, anterior*:
The most anterior right point on the chest.



Chin: The most protruding point on the bottom edge of the chin, along the jaw line.



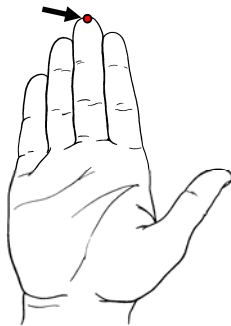
Clavicle, right and left: The superior points of the lateral ends of the clavicles (collar bones).



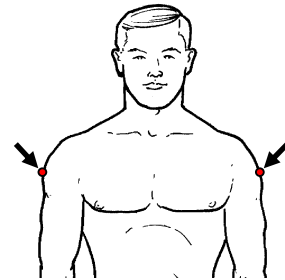
Crotch: The point at the level of the lower edge of the pubis bone of the os coxa.



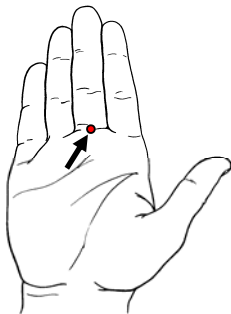
Dactylion III, right and left: The tip of the middle finger.



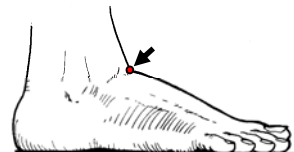
Deltoid point*, right and left: The midpoint of the left and right deltoid muscles.



Digit III, base: The center of the crease at the base of the middle finger.



Dorsal juncture of the foot and leg: The top of a skin crease between the foot and the front of the ankle when the knees and ankles are flexed about 30°.



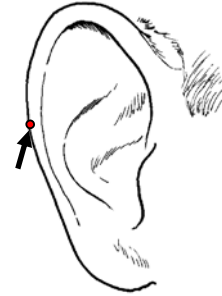
* Change from ANSUR. See page 17 for details.

LANDMARKS Continued

Ear, bottom: The lowest point of the right ear on its long axis.



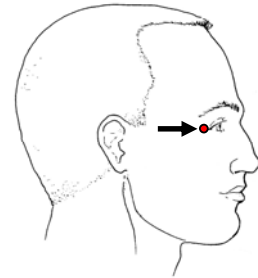
Ear point: The lateral point (farthest from the head) of the right ear.



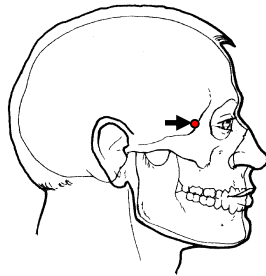
Ear, top: The highest point of the right ear on its long axis.



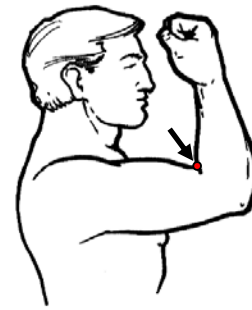
Ectocanthus: The outside corner of the right eye formed by the meeting of the upper and lower eyelids.



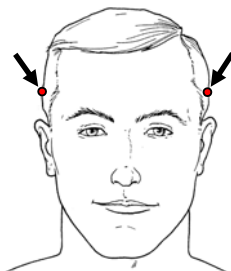
Ectoorbitale, right and left: The posterior point on the frontal process of the zygomatic bone at the level of the outer corner of the eye.



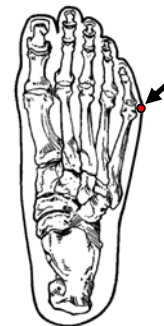
Elbow Crease: The skin crease on the inside of the elbow joint when the elbow is flexed 90°.



Euryon, right and left: The most lateral point in the region above the plane of attachment of the ear.



Fifth metatarsophalangeal protrusion: The most lateral protrusion of the right foot in the region of the fifth metatarsophalangeal joint.

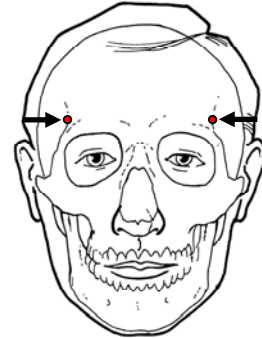


LANDMARKS Continued

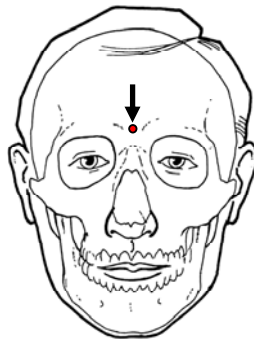
First metatarsophalangeal protrusion: The most medial protrusion of the right foot in the region of the first metatarsophalangeal joint.



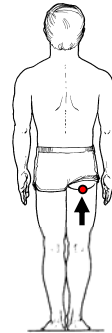
Frontotemporale, right and left: The point of deepest indentation of the temporal crest of the frontal bone above the browridges.



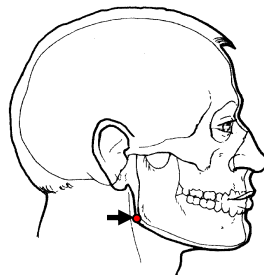
Glabella: The most anterior point on the frontal bone midway between the bony browridges.



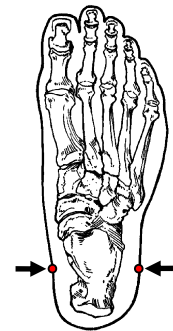
Gluteal furrow point: The lowest point of the lowest furrow or crease at the juncture of the right buttock and the thigh.



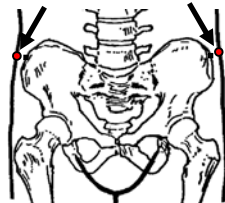
Gonion, right and left: The most lateral point on the posterior angle of the mandible (lower jawbone).



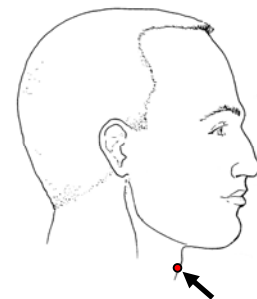
Heel point, lateral and medial: The lateral and medial points of the right heel located at or behind the most protruding point of the lateral malleolus (outside ankle bone).



Iliocristale, right and left: The highest palpable point of the right and left iliac crests of the pelvis, one-half the distance between the anterior superior iliac and posterior superior iliac spines.

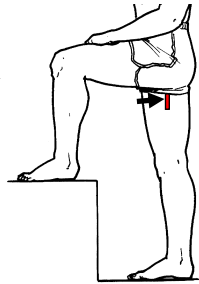


Infrathyroid: The inferior point of the thyroid cartilage (Adam's apple) in the midsagittal plane.

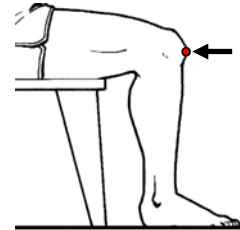


LANDMARKS Continued

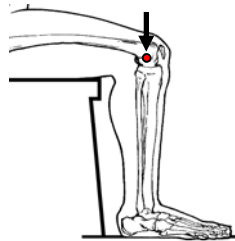
Inner thigh: A vertical line halfway between the front and back of the right inner thigh, extending downward from the level of the gluteal furrow.



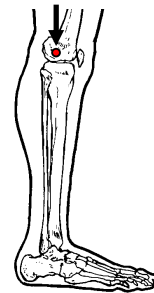
Knee point, anterior: The most protruding point of the right kneecap of a sitting participant.



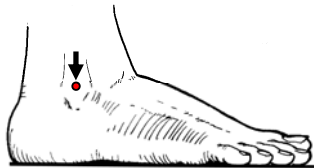
Lateral femoral epicondyle, sitting: The lateral point of the right femoral epicondyle (knee pivot point) of a sitting participant.



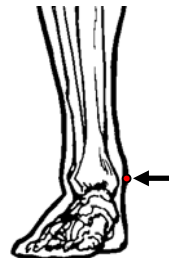
Lateral femoral epicondyle, standing: The lateral point of the right femoral epicondyle (knee pivot point) of a standing participant.



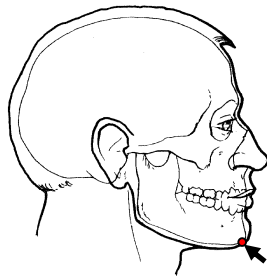
Lateral malleolus: The most lateral point of the right lateral malleolus (the ankle bone on the outside of the foot).



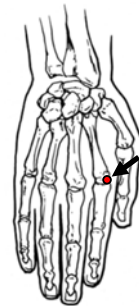
Medial malleolus: The medial point of the medial malleolus (inside ankle bone).



Menton: The inferior point of the mandible in the midsagittal plane (bottom of the chin).

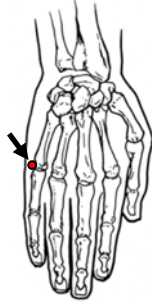


Metacarpale II: The most lateral point of the right metacarpophalangeal joint II (at the base of the index finger).

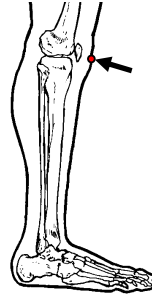


LANDMARKS Continued

Metacarpale V: The most medial point of the right metacarpophalangeal joint V (at the base of the little finger).



Midpatella: The anterior point halfway between the top and bottom of the patella (the kneecap).



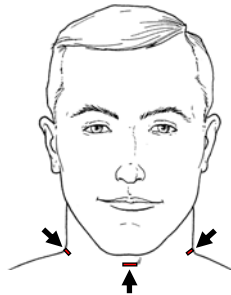
Midshoulder: The point on top of the right shoulder midway between the neck (trapezius point, right) and the tip of the shoulder (acromion, right).



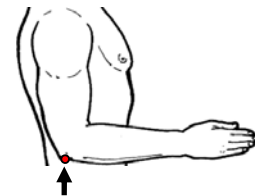
Midspine: A line down the center of the back.



Neck, anterior, right and left lateral: The anterior and lateral points at the base of the neck.



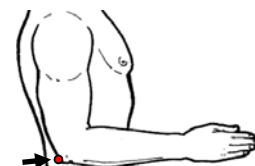
Olecranon, bottom: The lowest point of the elbow with the elbow flexed 90°.



Olecranon, center: A point on the center of the curvature of the right olecranon process with the elbow flexed about 115°.

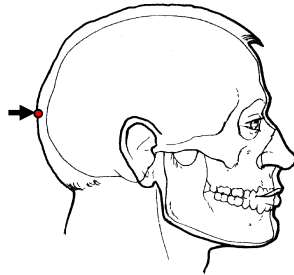


Olecranon, rear: The rearmost point of the elbow with the elbow flexed 90°.

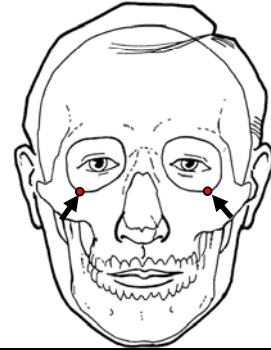


LANDMARKS Continued

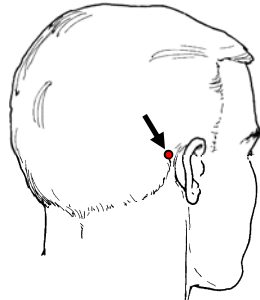
Opisthocranion:
The posterior point on the back of the head.



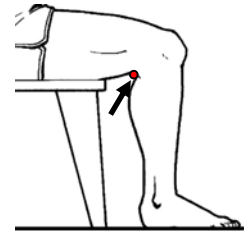
Orbitale*, right and left: The lowest point on the anterior border of the bony eye socket.



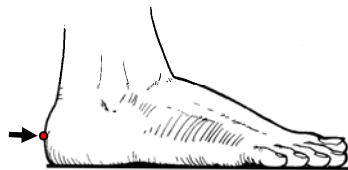
Otobasion, superior: The anterior superior point of the juncture between the right ear and the head.



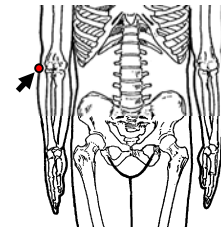
Popliteal fossa at the dorsal juncture of the calf and thigh: The bottom surface of the thigh just behind the knee.



Pternion:
The posterior point on the heel of the foot.



Radiale: The superior palpable point on the outside edge of the radius.



*Change from ANSUR. See page 18 for details.

LANDMARKS Continued

Scye: Landmarks on the upper arm and torso associated with the armhole of a garment.

Anterior scye on the torso: A short horizontal line on the torso originating at the apex of the right anterior axillary fold.



Midsbye, right and left: A short horizontal line bisecting the posterior diagonal scye landmark.



Posterior diagonal scye, right and left: A diagonal line connecting the apex of the posterior axillary fold with the acromion landmark on the tip of the shoulder.



Posterior horizontal scye, right and left: A short horizontal line on the back originating at the apex of the posterior axillary fold.

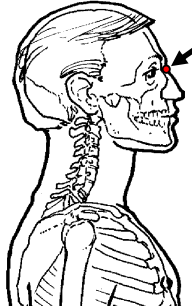


Posterior vertical scye, right and left: A short vertical line on the back originating at the apex of the posterior axillary fold.

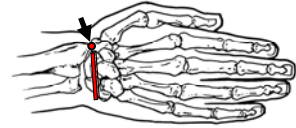


LANDMARKS Continued

Sellion: The point of the deepest depression of the nasal bones at the top of the nose.



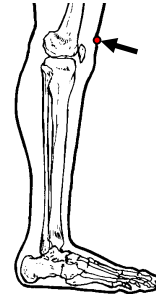
Stylin, dorsal stylin, and ventral stylin: The inferior point of the bottom of the radius and the extension of this landmark on the dorsal and ventral sides of the wrist.



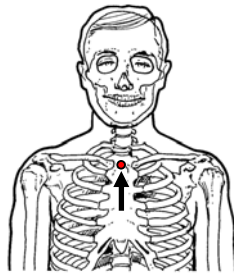
Submandibular: The juncture, in the midsagittal plane, of the lower jaw and the neck.



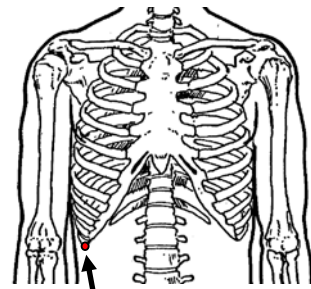
Suprapatella: The superior point of the patella (kneecap).



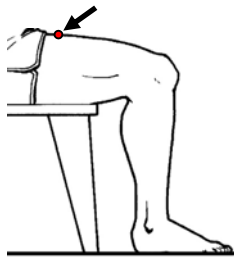
Suprasternale: The inferior point of the jugular notch of the sternum (top of the breastbone).



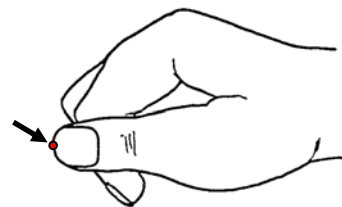
Tenth rib: The inferior point of the right tenth rib (bottom of the rib cage).



Thigh point, top: The highest point of the top of the right thigh of a sitting participant.

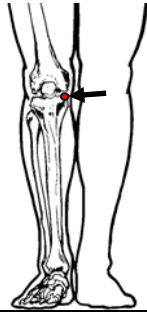


Thumbtip: The tip of the thumb.

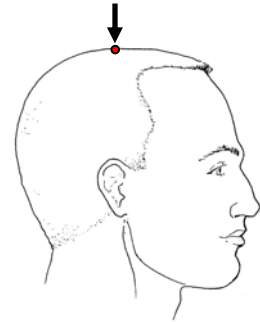


LANDMARKS Continued

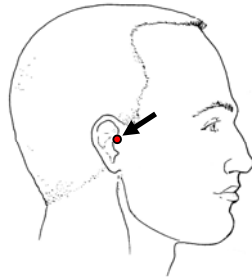
Tibiale: The superior palpable point on the medial condyle of the right tibia.



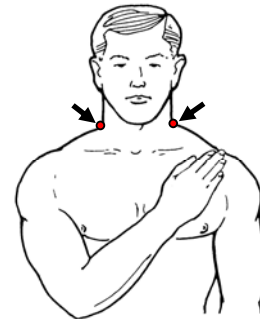
Top of head (vertex): The highest point on the head when the head is in the Frankfurt plane.



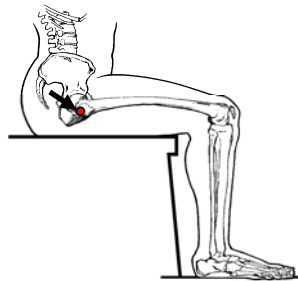
Tragion, right and left: The superior point on the juncture of the cartilaginous flap (tragus) of the ear with the head.



Trapezius, right and left: The point at which the anterior border of the trapezius muscle crosses the neck lateral landmark.



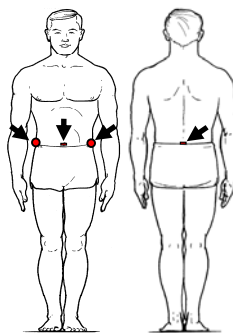
Trochanter: A point at the center of the lateral surface of the right greater trochanter of the right femur of a sitting participant.



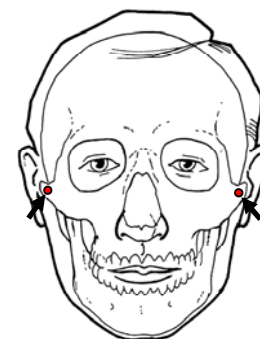
Trochanterion: The superior point of the greater trochanter of the right femur of a standing participant.



Waist (omphalion), right, left, anterior and posterior: The level at the center of the navel.

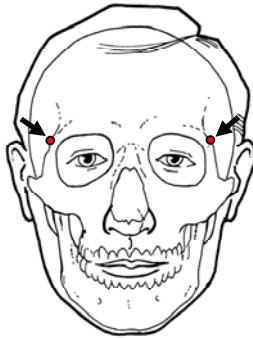


Zygion, right and left: The most lateral point on the zygomatic arch.



LANDMARKS Continued

Zygofrontale, right and left: The most lateral point of the frontal bone on its zygomatic process.



CHAPTER III

THE SAMPLE

Anthropometric data for design are most useful when the survey sample is truly representative of the overall population for which the designs will be created. It is relatively easy, after the fact, to determine whether a particular sample is representative of the target population. It is a far greater challenge to collect a representative sample in real time, particularly when a large proportion of the target population is deployed in military operations.

Previous research (Bradt Miller et al., 1985; ISO 15535) has shown that age, racial background, and gender are the key drivers of anthropometric variability. Thus a plan to achieve representativeness in an anthropometric survey sample must take these characteristics into account. The sampling plan for this survey was built around an age-racial group matrix, with the genders treated separately.

In addition to the demographic sampling requirements, it is desirable to have a cross section of occupations in an anthropometric database. To achieve this, the USMC decided to have the sample proportionately spread across Marine Air-Ground Task Force (MAGTF) elements.

A sample must also be large enough to accurately reflect the variability in the population. A power analysis is typically used to calculate the overall number of participants who should be measured to achieve reasonable confidence in the resulting statistics. A power analysis was done in this case (see Appendix B). Results showed that, ideally, the target sample should include 900 participants for each gender and component subgroup. It became apparent early in the study that USMC Reserve personnel (especially females) were so few in number that separate databases for Active Duty and Reserve were not feasible.

A complete description of the development of the sample size, the sampling plan, and its implementation appears in Appendix B. For the remainder of this chapter, as elsewhere in this report, Active Duty and Reserve Marines are combined in the tables, and all tables refer to the actual, as opposed to the target, sample.

Table 3 shows the male and female samples acquired at the three measuring locations. The measuring team was at Marine Corps Base (MCB) Quantico for the shortest time, and the sample from there was the smallest. Across all locations, the sample was distributed among command units and ground, aviation, and logistics combat units (Table 4). Within those broad elements, participants came from a range of Military Occupational Specialty (MOS) fields (Table 5).

The age distribution of MC-ANSUR participants ranged from 17 to 50 for males, and from 18 to 48 for females. The full distribution is seen in Table 6.

TABLE 3

MC-ANSUR Measuring Sites and Sample Sizes

Site	Males	Females	Total
Camp Lejeune	415	250	665
Camp Pendleton	767	326	1093
Quantico	119	44	163
Total	1301	620	1921

TABLE 4

MC-ANSUR Participants by MAGTF Element

MAGTF Element	Males		Females		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Command	309	23.75	214	34.52	523	27.23
Ground Combat	482	37.05	102	16.45	584	30.40
Aviation Combat	83	6.38	48	7.74	131	6.82
Logistics Combat	427	32.82	256	41.29	683	35.55
Total	1301	100.00	620	100.00	1921	100.00

TABLE 5

Primary MOS Fields of MC-ANSUR Participants

MOS	Primary MOS Field	Males		Females	
		Frequency	Percent	Frequency	Percent
35	Motor Transport	213	16.37	53	8.55
03	Infantry	117	8.99	0	0.00
06	Communications	113	8.69	81	13.06
13	Engineer, Construction, Facilities, & Equipment	88	6.76	41	6.61
18	Tank and Assault Amphibious Vehicle	70	5.38	0	0.00
30	Supply Administration and Operations	68	5.23	106	17.10
21	Ground Ordnance Maintenance	66	5.07	9	1.45
04	Logistics	63	4.84	42	6.77
08	Artillery	61	4.69	0	0.00
58	Military Police and Corrections	61	4.69	19	3.06
28	Data/Communications Maintenance	49	3.77	10	1.61
01	Personnel and Administration	43	3.31	58	9.35
02	Intelligence	35	2.69	34	5.48
26	Signals Intelligence/Ground Electronic	34	2.61	23	3.71
60	Aircraft Maintenance	33	2.54	21	3.39

TABLE 5 Continued

Primary MOS Fields of MC-ANSUR Participants

MOS	Primary MOS Field	Males		Females	
		Frequency	Percent	Frequency	Percent
11	Utilities	31	2.38	15	2.42
23	Ammunition and Explosive Ordnance Disposal	29	2.23	31	5.00
33	Food Service	27	2.08	12	1.94
34	Financial Management	24	1.84	16	2.58
70	Airfield Services	17	1.31	3	0.48
63	Avionics	8	0.61	6	0.97
46	Combat Camera (COMCAM)	8	0.61	5	0.81
05	Marine Air Ground Task Force (MAGTF) Plans	7	0.54	4	0.65
72	Air Control/Air Support/Anti-air Warfare/Air Traffic Control	5	0.38	0	0.00
88, 89	Miscellaneous MOS's (Category II)	5	0.38	1	0.16
75	Pilots/Naval Flight Officers	5	0.38	2	0.32
65	Aviation Ordnance	4	0.31	0	0.00
57	Chemical, Biological, Radiological, and Nuclear (CBRN) Defense	4	0.31	5	0.81
55	Music	4	0.31	4	0.65
44	Legal Services	3	0.23	4	0.65
41	Morale Welfare and Recreation	2	0.15	0	0.00
66	Aviation Logistics	1	0.08	5	0.81
68	Meteorological and Oceanographic (METOC)	1	0.08	1	0.16
43	Public Affairs	1	0.08	3	0.48
31	Distribution Management	0	0.00	3	0.48
73	Navigation Officer/Enlisted Flight Crew	0	0.00	1	0.16
48	Recruiting and Retention Specialist	0	0.00	1	0.16
	PMOS Missing	1	0.08	1	0.16
	Total	1301	100.00	620	100.00

TABLE 6

Ages of MC-ANSUR Participants

Age	Males			Females		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
17	1	0.08	0.08	0	0.00	0.00
18	14	1.08	1.15	13	2.10	2.10
19	134	10.30	11.45	72	11.61	13.71
20	199	15.30	26.75	87	14.03	27.74
21	196	15.07	41.81	91	14.68	42.42
22	150	11.53	53.34	77	12.42	54.84
23	106	8.15	61.49	54	8.71	63.55
24	77	5.92	67.41	42	6.77	70.32
25	67	5.15	72.56	37	5.97	76.29
26	57	4.38	76.94	25	4.03	80.32
27	55	4.23	81.17	19	3.06	83.39
28	26	2.00	83.17	15	2.42	85.81
29	27	2.08	85.24	9	1.45	87.26
30	25	1.92	87.16	11	1.77	89.03
31	20	1.54	88.70	14	2.26	91.29
32	19	1.46	90.16	8	1.29	92.58
33	15	1.15	91.31	5	0.81	93.39
34	14	1.08	92.39	6	0.97	94.35
35	12	0.92	93.31	10	1.61	95.97
36	15	1.15	94.47	3	0.48	96.45
37	11	0.85	95.31	2	0.32	96.77
38	12	0.92	96.23	1	0.16	96.94
39	5	0.38	96.62	4	0.65	97.58
40	6	0.46	97.08	3	0.48	98.06
41	7	0.54	97.62	3	0.48	98.55
42	8	0.61	98.23	4	0.65	99.19
43	1	0.08	98.31	0	0.00	99.19
44	6	0.46	98.77	0	0.00	99.19
45	4	0.31	99.08	1	0.16	99.35
46	4	0.31	99.39	2	0.32	99.68
47	2	0.15	99.54	1	0.16	99.84
48	2	0.15	99.69	1	0.16	100.00
49	3	0.23	99.92	0	0.00	100.00
50	1	0.08	100.00	0	0.00	100.00
Total	1301	100.00	100.00	620	100.00	100.00

Comparing the age distribution of MC-ANSUR participants with USMC 2010 census results (DMDC, 2010) shows an over-representation of younger Marines in the MC-ANSUR sample and a concomitant under-representation of older age groups (Table 7). This type of age bias frequently occurs in military research because younger service members are both more numerous and more likely to be available to participate than are more senior individuals.

TABLE 7

Age Groups of MC-ANSUR Participants Compared to USMC 2010 Census Data

Age Group	Males			Females		
	MC-ANSUR		USMC Census	MC-ANSUR		USMC Census
	Frequency	Percent	Percent	Frequency	Percent	Percent
≤ 20	348	26.75	21.8	172	27.74	25.8
21-25	596	45.81	43.4	301	48.55	44.4
26-30	190	14.60	16.7	79	12.74	16.5
31-40	129	9.92	14.6	56	9.03	11.1
≥41	38	2.92	3.5	12	1.94	2.2
Total	1301	100.00	100.00	620	100.00	100.00

The rank structure of the MC-ANSUR sample is seen in Table 8. The most frequently measured rank was Lance Corporal (E3), for both males and females. These individuals were typically under 25 years of age. As would be expected, the rank structure is closely tied to the age distribution (Table 9). The birthplace of the participants is summarized in Table 10. The most common birthplace was California, for both males and females. The most frequent international birth location was Mexico.

TABLE 8

Military Ranks of MC-ANSUR Participants

Military Rank	Males		Females	
	Frequency	Percent	Frequency	Percent
E1 Private	21	1.61	5	0.81
E2 Private First Class	173	13.30	75	12.10
E3 Lance Corporal	467	35.90	196	31.61
E4 Corporal	303	23.29	171	27.58
E5 Sergeant	152	11.68	89	14.35
E6 Staff Sergeant	82	6.30	25	4.03
E7 Gunnery Sergeant	39	3.00	16	2.58
E8 Master Sergeant	15	1.15	9	1.45
First Sergeant				
E9 Sergeant Major	13	1.00	6	0.97
Master Gunnery Sergeant				
O1 First Lieutenant	3	0.23	2	0.32
O2 Second Lieutenant	4	0.31	8	1.29
O3 Captain	12	0.92	8	1.29
O4 Major	6	0.46	5	0.81
O5 Lieutenant Colonel	6	0.46	2	0.32
W2 Chief Warrant Officer 2	3	0.23	2	0.32
W3 Chief Warrant Officer 3	1	0.08	0	0.00
W4 Chief Warrant Officer 4	0	0.00	1	0.16
W5 Chief Warrant Officer 5	1	0.08	0	0.00
Total	1301	100.00	620	100.00

TABLE 9

Military Ranks by Age Groups of MC-ANSUR Participants

Military Rank	Age Group					Total
	≤20	21-25	26-30	31-40	≥41	
E1 Private	14	12	0	0	0	26
E2 Private First Class	181	64	3	0	0	248
E3 Lance Corporal	295	331	35	2	0	663
E4 Corporal	30	370	69	5	0	474
E5 Sergeant	0	105	104	31	1	241
E6 Staff Sergeant	0	5	37	62	3	107
E7 Gunnery Sergeant	0	0	4	44	7	55
E8 Master Sergeant	0	0	0	13	11	24
First Sergeant						
E9 Sergeant Major	0	0	0	5	14	19
Master Gunnery Sergeant						
O1 First Lieutenant	0	3	1	1	0	5
O2 Second Lieutenant	0	7	3	2	0	12
O3 Captain	0	0	11	8	1	20
O4 Major	0	0	0	8	3	11
O5 Lieutenant Colonel	0	0	0	1	7	8
W2 Chief Warrant Officer 2	0	0	2	3	0	5
W3 Chief Warrant Officer 3	0	0	0	0	1	1
W4 Chief Warrant Officer 4	0	0	0	0	1	1
W5 Chief Warrant Officer 5	0	0	0	0	1	1
Total	520	897	269	185	50	1921

TABLE 10

Birth Locations of MC-ANSUR Participants

Birth Location	Males		Females	
	Frequency	Percent	Frequency	Percent
Alabama	17	1.31	6	0.97
Alaska	6	0.46	1	0.16
Arizona	18	1.38	8	1.29
Arkansas	11	0.85	4	0.65
California	191	14.68	78	12.58
Colorado	19	1.46	15	2.42
Connecticut	10	0.77	11	1.77
Delaware	3	0.23	2	0.32
District of Columbia	11	0.85	4	0.65
Florida	41	3.15	29	4.68
Georgia	21	1.61	13	2.10
Hawaii	7	0.54	0	0.0
Idaho	8	0.61	1	0.16
Illinois	38	2.92	24	3.87
Indiana	24	1.84	11	1.77
Iowa	11	0.85	2	0.32
Kansas	13	1.00	7	1.13
Kentucky	16	1.23	5	0.81
Louisiana	21	1.61	8	1.29
Maine	5	0.38	2	0.32
Maryland	16	1.23	16	2.58
Massachusetts	19	1.46	11	1.77
Michigan	48	3.69	31	5.00
Minnesota	17	1.31	7	1.13
Mississippi	8	0.61	2	0.32
Missouri	26	2.00	6	0.97
Montana	5	0.38	0	0.00
Nebraska	10	0.77	3	0.48
Nevada	8	0.61	7	1.13
New Hampshire	5	0.38	5	0.81
New Jersey	28	2.15	10	1.61
New Mexico	11	0.85	7	1.13
New York	66	5.07	51	8.23
North Carolina	29	2.23	11	1.77
North Dakota	1	0.08	2	0.32
Ohio	51	3.92	17	2.74
Oklahoma	14	1.08	2	0.32
Oregon	28	2.15	8	1.29
Pennsylvania	51	3.92	23	3.71
Rhode Island	1	0.08	1	0.16

TABLE 10 Continued

Birth Locations of MC-ANSUR Participants

Birth Location	Males		Females	
	Frequency	Percent	Frequency	Percent
South Carolina	20	1.54	10	1.61
South Dakota	7	0.54	2	0.32
Tennessee	15	1.15	3	0.48
Texas	122	9.38	41	6.61
Utah	9	0.69	5	0.81
Vermont	2	0.15	2	0.32
Virginia	30	2.31	20	3.23
Washington	33	2.54	15	2.42
West Virginia	5	0.38	1	0.16
Wisconsin	14	1.08	9	1.45
Wyoming	2	0.15	5	0.81
Unknown – United States	0	0.00	1	0.16
International Birth locations				
American Samoa	0	0.00	1	0.16
Australia	0	0.00	1	0.16
Belgium	1	0.08	0	0.00
Bermuda	1	0.08	0	0.00
Bolivia	0	0.00	1	0.16
Cambodia	1	0.08	0	0.00
Canada	3	0.23	2	0.32
China	2	0.15	0	0.00
Colombia	2	0.15	3	0.48
Cuba	1	0.08	2	0.32
Dominican Republic	3	0.23	2	0.32
Ecuador	1	0.08	1	0.16
El Salvador	2	0.15	0	0.00
Ethiopia	1	0.08	0	0.00
Fiji	1	0.08	0	0.00
Germany	6	0.46	7	1.13
Guam	2	0.15	0	0.00
Guyana	1	0.08	1	0.16
Haiti	1	0.08	0	0.00
Honduras	1	0.08	1	0.16
Iceland	1	0.08	0	0.00
India	2	0.15	0	0.00
Indonesia	1	0.08	0	0.00
Ireland	0	0.00	2	0.32
Italy	1	0.08	0	0.00
Jamaica	9	0.69	1	0.16
Japan	2	0.15	0	0.00

TABLE 10 Continued

Birth Locations of MC-ANSUR Participants

Birth Location	Males		Females	
	Frequency	Percent	Frequency	Percent
Kuwait	1	0.08	0	0.00
Mexico	22	1.69	11	1.77
Micronesia	1	0.08	0	0.00
Nicaragua	2	0.15	1	0.16
Nigeria	1	0.08	0	0.00
Northern Mariana Islands	1	0.08	1	0.16
Palau	1	0.08	0	0.00
Panama	2	0.15	3	0.48
Peru	3	0.23	0	0.00
Philippines	7	0.54	1	0.16
Poland	0	0.00	1	0.16
Puerto Rico	8	0.61	3	0.48
Russia	2	0.15	0	0.00
South Africa	1	0.08	0	0.00
South Korea	3	0.23	1	0.16
Thailand	0	0.00	1	0.16
The Netherlands	1	0.08	0	0.00
Togo	1	0.08	0	0.00
Trinidad and Tobago	1	0.08	3	0.48
Ukraine	0	0.00	1	0.16
United Kingdom	2	0.15	1	0.16
Venezuela	0	0.00	1	0.16
Vietnam	3	0.23	0	0.00
Unknown - International	0	0.00	1	0.16
Total	1301	100.00	620	100.00

As noted above, to be anthropometrically representative, a survey sample should match as closely as possible both the age and the racial/ethnic distributions of the target population. In order to make sure that racial/ethnic information was accurately obtained from participating Marines, a somewhat more detailed series of questions was used than is typically the case (Appendix H). Further, in cases where the answers to the questions were not clear, the participants were interviewed to clarify the answers. This more detailed information is especially useful now and will be in the future, as Americans are generally more likely to come from multi-racial backgrounds than they were in previous generations (US Census Bureau, 2011). Table 11 shows the distribution of the MC-ANSUR sample into the main racial/ethnic groups, as well as the key population subgroups. It is interesting to note the significant number of participants who declared more than one racial group (12.9 percent of males and 13.6 percent of females).

TABLE 11

Population Subgroups of MC-ANSUR Participants

Population Subgroup	Males		Females	
	Frequency	Percent	Frequency	Percent
White, Not of Hispanic Descent	764	58.72	334	53.87
Black, Not of Hispanic Descent	117	8.99	81	13.06
Hispanic	181	13.91	101	16.29
Mexican		113		55
Puerto Rican		20		17
Cuban		1		1
Latin American		29		19
Two or more groups		15		8
Unknown Hispanic		3		1
Asian or Pacific Islander	34	2.61	12	1.94
Filipino		12		3
Asian		16		8
Pacific Islander		5		0
Two or more groups		1		1
Native American	11	0.85	6	0.97
Navajo		4		3
Pueblo		2		0
Sioux		1		2
Eskimo		2		0
Other Tribes		2		1
Other (Asian Indian)	4	0.31	0	0.00
Two Population Subgroups	177	13.60	76	12.26
White & Hispanic		59		29
White & Asian		27		9
White & Black		18		10
White & Native American		16		12
Black & Hispanic		11		7
Other Combinations		46		9
More than Two Subgroups	11	0.85	9	1.45
Unknown	2	0.15	1	0.16
Total	1301	100.00	620	100.00

Table 12 compares the MC-ANSUR sample to the 2010 USMC Census data for racial/ethnic groups (DMDC, 2010). The differences between the two data sets are likely due to the difference in survey forms. The MC-ANSUR form allowed selection of multiple racial/ethnic groups while the DMDC, 2010 form allowed only single selections. When the interviewers noticed, early in data collection, that racial/ethnic designations on unit rosters did not correspond to participants' responses on the MC-ANSUR survey form, they began asking an additional question of those participants who selected more than one racial/ethnic group on the rosters: "When you fill out the racial group question on military forms, which race do you select?"

Unfortunately, not all of the participants were asked the additional question, since some of the participants had completed their forms before the interviewers started asking the question. Nevertheless, analysis of the available data suggests that about 75% of Hispanic/Black Marines, and 85% of White/Black Marines selected "Black" on military forms. About one-third of White/Hispanic, White/Asian, and White/NA mixes select "White" on the forms. If the 12.9% of males and 13.6% of females who were from more than one group are distributed among the single categories, as they would be using a standard military form, then the racial/ethnic group percentages in the MC-ANSUR sample are much closer to the USMC 2010 Census data, which appear to indicate that the racial/ethnic distributions in the MC-ANSUR sample are representative of the USMC as a whole.

TABLE 12

Population Subgroups in the MC-ANSUR Database
Compared to USMC 2010 Census Data

Population Subgroup	Males			Females		
	MC-ANSUR		DMDC	MC-ANSUR		DMDC
	Frequency	Percent	Percent	Frequency	Percent	Percent
White, Not of Hispanic Descent	764	58.7	70.3	334	53.9	57.8
Black, Not of Hispanic Descent	117	9.0	9.7	81	13.1	15.5
Hispanic	181	13.9	12.6	101	16.3	16.7
Asian or Pacific Islander	34	2.6	3.0	12	1.9	3.8
Native American	11	0.8	0.7	6	1.0	1.1
Other (Asian Indian)	4	0.3	0.3	0	0.00	1.0
Two Groups	177	13.6	n/a	76	12.3	n/a
More than Two Groups	11	0.8	n/a	9	1.5	n/a
Unknown	2	0.2	3.4	1	0.2	4.1
Total	1301	100.00	100.00	620	100.00	100.00

Because the MC-ANSUR survey was conducted while the USMC had significant military commitments in Iraq and Afghanistan, questions regarding deployment experience were included in the biographical portion of the survey. Tables 13 and 14 summarize the most recent deployment experience of MC-ANSUR participants. As can

be seen, 45% of male MC-ANSUR participants and 58% of female participants had never been deployed, with most non-deployed Marines coming from the two youngest age groups.

TABLE 13

Time Elapsed Since Last Deployment of MC-ANSUR Participants

Returned from Deployment	Males		Females	
	Frequency	Percent	Frequency	Percent
< 1 month ago	19	1.46	3	0.48
1-3 months ago	105	8.07	41	6.61
4-6 months ago	125	9.61	50	8.06
7-12 months ago	162	12.45	45	7.26
> 1 year ago	299	22.98	123	19.84
Never deployed	591	45.43	357	57.58
Unreported	0	0.00	1	0.16
Total	1301	100.00	620	100.00

TABLE 14

Relationship of Age to Deployment Experience Among MC-ANSUR Participants

Returned from Deployment	Age Group					Total
	≤20	21-25	26-30	31-40	≥41	
< 1 month ago	3	16	1	2	0	22
1-3 months ago	33	72	29	8	4	146
4-6 months ago	13	104	28	26	4	175
7-12 months ago	18	117	39	29	4	207
> 1 year ago	2	173	110	102	35	422
Never deployed	450	415	62	18	3	948
Unreported	1	0	0	0	0	1
Total	520	897	269	185	50	1921

During the interviews, participants were asked to estimate their own heights and weights. These data were combined with the measured values. This comparison of estimated and measured data evaluates the value of questionnaire surveys pertaining to body size. Selected descriptive statistics for height and weight are shown in Table 15 and 16, respectively. In general, MC-ANSUR participants estimated their weight quite accurately, but tended to overestimate their height.

TABLE 15

Comparison of Estimated and Measured Heights of MC-ANSUR Participants
(values in cm)

Statistic	Males		Females	
	Estimated Height	Measured Height	Estimated Height	Measured Height
n	1300	1301	620	620
Mean	177.66	175.34	163.78	162.49
Standard Deviation	7.53	6.97	6.67	6.22
Kurtosis	-.10	-.08	.76	-.25
Skewness	.20	.19	.04	.09
Maximum	203.20	197.50	190.50	180.40
Minimum	154.94	151.80	132.08	145.40
1 st Percentile	162.56	160.61	149.86	149.12
2 nd Percentile	162.56	161.80	149.86	150.44
5 th Percentile	167.64	164.70	152.40	152.31
10 th Percentile	167.64	166.50	154.94	154.30
25 th Percentile	172.72	170.75	160.02	158.03
50 th Percentile	177.80	175.00	162.56	162.60
75 th Percentile	182.88	179.80	167.64	166.48
90 th Percentile	187.96	184.98	172.72	170.59
95 th Percentile	190.50	187.30	175.26	173.50
98 th Percentile	193.04	190.50	177.80	175.50
99 th Percentile	195.58	192.10	180.34	177.05

TABLE 16

Comparison of Estimated and Measured Weights of MC-ANSUR Participants
(values in kg)

Statistic	Males		Females	
	Estimated Weight	Measured Weight	Estimated Weight	Measured Weight
Mean	80.60	80.26	62.85	63.60
Standard Deviation	11.88	11.19	8.09	8.40
Kurtosis	-0.04	0.08	2.23	2.19
Skewness	0.36	0.35	0.76	0.76
Maximum	123.1	122.5	111.1	113.8
Minimum	51.9	53.1	43.1	44.0
1 st Percentile	57.4	58.1	47.3	47.3
2 nd Percentile	58.8	59.0	48.1	48.3
5 th Percentile	62.5	62.6	50.8	50.9
10 th Percentile	65.7	65.8	53.1	53.3
25 th Percentile	71.9	72.6	57.6	57.9
50 th Percentile	79.9	79.4	62.1	63.3
75 th Percentile	88.3	87.1	68.0	68.5
90 th Percentile	96.5	95.3	72.6	74.7
95 th Percentile	101.7	99.8	76.2	77.3
98 th Percentile	106.9	105.7	82.7	83.6
99 th Percentile	111.1	109.3	86.2	88.2

CHAPTER IV

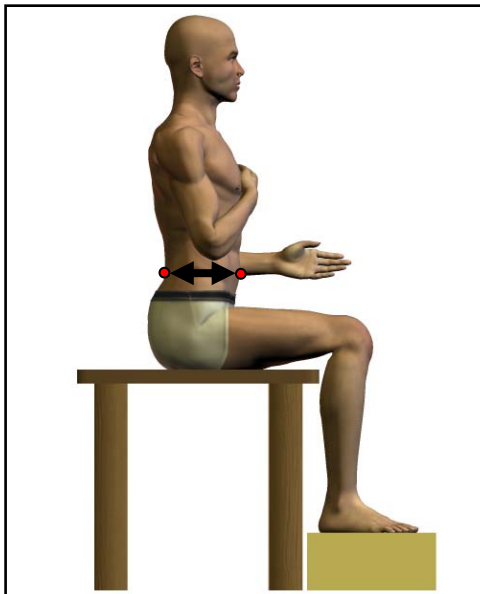
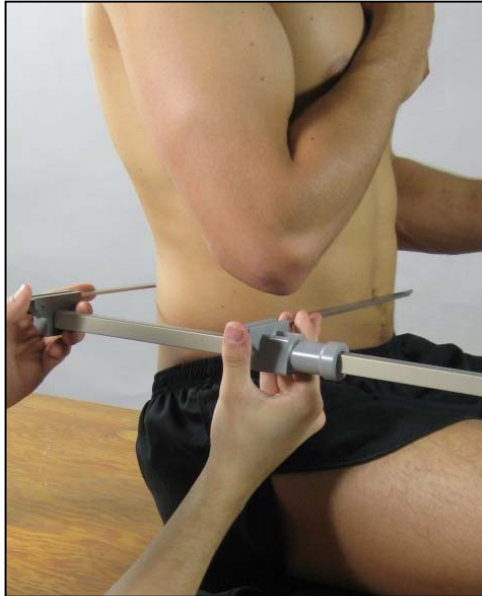
THE BODY MEASUREMENTS

Ninety-four directly measured dimensions were obtained in this survey, using traditional measuring instruments and methods. Where there was a choice of right or left, all measurements were taken on the right side unless otherwise specified or in the rare cases where an injury or anatomical abnormality made it necessary to measure on the left side. All measurements were made to the nearest millimeter. Weight was taken to the nearest 0.1 kilogram. Detailed illustrated instructions for making these measurements can be found in the Measurer's Handbook (Hotzman et al., 2011).

A visual index, designed to assist the reader in locating particular dimensions whose names may be unfamiliar, appears in Appendix C. The numbers on the visual index correspond to the dimension numbers. The following pages include brief dimension descriptions, summary statistics, and percentile and frequency tables for the male and female participants. Users of these data will note 0.00 standard error values for some means and standard deviations. This occurs because values in these tables are not listed beyond two decimal places.

(1) ABDOMINAL EXTENSION DEPTH, SITTING

The horizontal distance between the abdominal point anterior and the back at the same level is measured with a beam caliper. The participant sits erect, looking straight ahead. The measurement is made at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
17.20	6.77	1ST	18.40	7.24
17.80	7.01	2ND	19.00	7.48
18.16	7.16	3RD	19.30	7.60
18.60	7.32	5TH	19.90	7.83
19.30	7.60	10TH	20.60	8.11
19.70	7.76	15TH	21.10	8.31
20.10	7.91	20TH	21.50	8.46
20.50	8.07	25TH	21.90	8.62
20.80	8.19	30TH	22.30	8.78
21.00	8.27	35TH	22.70	8.94
21.30	8.39	40TH	23.10	9.09
21.60	8.50	45TH	23.40	9.21
21.90	8.62	50TH	23.70	9.33
22.20	8.74	55TH	24.10	9.49
22.50	8.86	60TH	24.50	9.65
22.80	8.98	65TH	24.90	9.80
23.20	9.13	70TH	25.40	10.00
23.58	9.28	75TH	25.90	10.20
24.20	9.53	80TH	26.40	10.39
24.70	9.72	85TH	27.09	10.66
25.50	10.04	90TH	27.80	10.94
26.60	10.47	95TH	28.70	11.30
27.70	10.91	97TH	29.40	11.57
29.46	11.59	98TH	30.00	11.81
30.14	11.86	99TH	31.20	12.28

(1) ABDOMINAL EXTENSION DEPTH, SITTING

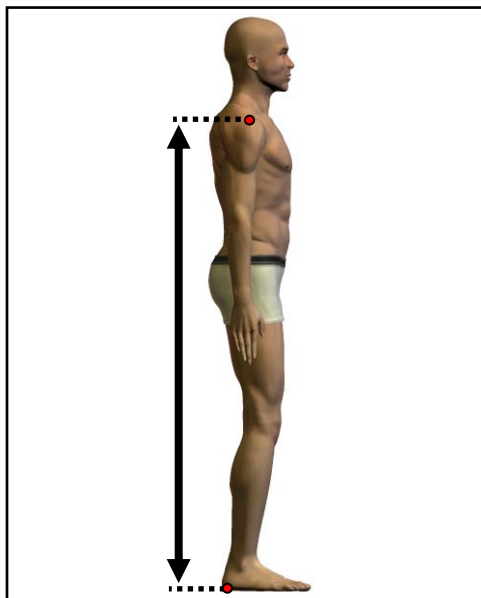
FEMALES		
CM		IN
22.22	MEAN	8.75
0.10	STD ERROR (MEAN)	0.04
2.58	STANDARD DEVIATION	1.02
0.07	STD ERROR (STD DEV)	0.03
16.40	MINIMUM	6.46
33.60	MAXIMUM	13.23
SKEWNESS		0.85
KURTOSIS		4.36
COEFFICIENT OF VARIATION		11.6%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
23.99	MEAN	9.45
0.08	STD ERROR (MEAN)	0.03
2.80	STANDARD DEVIATION	1.10
0.05	STD ERROR (STD DEV)	0.02
16.60	MINIMUM	6.54
36.70	MAXIMUM	14.45
SKEWNESS		0.49
KURTOSIS		3.44
COEFFICIENT OF VARIATION		11.7%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES		MALES			
E	FPct	CumF	CumFPct	CM		F	FPct	CumF	CumFPct
2	0.32	2	0.32	16.25	-	16.75	1	0.08	0.08
5	0.81	7	1.13	16.75	-	17.25	0	0.00	0.08
4	0.65	11	1.77	17.25	-	17.75	0	0.00	0.08
10	1.61	21	3.39	17.75	-	18.25	9	0.69	0.77
13	2.10	34	5.48	18.25	-	18.75	9	0.69	1.46
23	3.71	57	9.19	18.75	-	19.25	17	1.31	2.77
40	6.45	97	15.65	19.25	-	19.75	17	1.31	4.08
43	6.94	140	22.58	19.75	-	20.25	35	2.69	6.77
44	7.10	184	29.68	20.25	-	20.75	57	4.38	11.15
58	9.35	242	39.03	20.75	-	21.25	70	5.38	16.54
49	7.90	291	46.94	21.25	-	21.75	81	6.23	22.77
54	8.71	345	55.65	21.75	-	22.25	89	6.85	29.62
50	8.06	395	63.71	22.25	-	22.75	82	6.31	35.92
47	7.58	442	71.29	22.75	-	23.25	82	6.31	42.23
32	5.16	474	76.45	23.25	-	23.75	109	8.38	50.62
31	5.00	505	81.45	23.75	-	24.25	89	6.85	57.46
23	3.71	528	85.16	24.25	-	24.75	78	6.00	63.46
18	2.90	546	88.06	24.75	-	25.25	61	4.69	68.15
21	3.39	567	91.45	25.25	-	25.75	63	4.85	73.00
9	1.45	576	92.90	25.75	-	26.25	71	5.46	78.46
14	2.26	590	95.16	26.25	-	26.75	56	4.31	82.77
4	0.65	594	95.81	26.75	-	27.25	50	3.85	86.62
9	1.45	603	97.26	27.25	-	27.75	43	3.31	89.92
1	0.16	604	97.42	27.75	-	28.25	45	3.46	93.38
1	0.16	605	97.58	28.25	-	28.75	25	1.92	95.31
2	0.32	607	97.90	28.75	-	29.25	18	1.38	96.69
3	0.48	610	98.39	29.25	-	29.75	14	1.08	97.77
5	0.81	615	99.19	29.75	-	30.25	5	0.38	98.15
1	0.16	616	99.35	30.25	-	30.75	9	0.69	98.85
2	0.32	618	99.68	30.75	-	31.25	3	0.23	99.08
0	0.00	618	99.68	31.25	-	31.75	3	0.23	99.31
0	0.00	618	99.68	31.75	-	32.25	0	0.00	99.31
1	0.16	619	99.84	32.25	-	32.75	1	0.08	99.38
0	0.00	619	99.84	32.75	-	33.25	0	0.00	99.38
1	0.16	620	100.00	33.25	-	33.75	4	0.31	99.69
				33.75	-	34.25	2	0.15	99.85
				34.25	-	34.75	0	0.00	99.85
				34.75	-	35.25	0	0.00	99.85
				35.25	-	35.75	0	0.00	99.85
				35.75	-	36.25	0	0.00	99.85
				36.25	-	36.75	2	0.15	100.00

(2) ACROMIAL HEIGHT

The vertical distance between a standing surface and the right acromion landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is made at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
121.42	47.81	1ST	130.01	51.18
122.48	48.22	2ND	131.50	51.77
122.96	48.42	3RD	132.10	52.01
124.20	48.90	5TH	133.11	52.40
126.10	49.65	10TH	135.30	53.27
127.00	50.00	15TH	136.73	53.83
128.02	50.40	20TH	138.04	54.35
129.10	50.83	25TH	139.10	54.76
130.00	51.18	30TH	139.90	55.08
130.80	51.50	35TH	140.80	55.43
131.74	51.87	40TH	141.58	55.74
132.60	52.20	45TH	142.20	55.98
133.30	52.48	50TH	143.00	56.30
133.80	52.68	55TH	143.90	56.65
134.40	52.91	60TH	144.60	56.93
134.90	53.11	65TH	145.40	57.24
135.70	53.43	70TH	146.50	57.68
136.80	53.86	75TH	147.60	58.11
137.88	54.28	80TH	148.80	58.58
138.79	54.64	85TH	150.00	59.06
140.29	55.24	90TH	152.00	59.84
143.00	56.30	95TH	154.40	60.79
144.04	56.70	97TH	155.70	61.30
144.80	57.01	98TH	157.00	61.81
146.72	57.77	99TH	159.59	62.83

(2) ACROMIAL HEIGHT

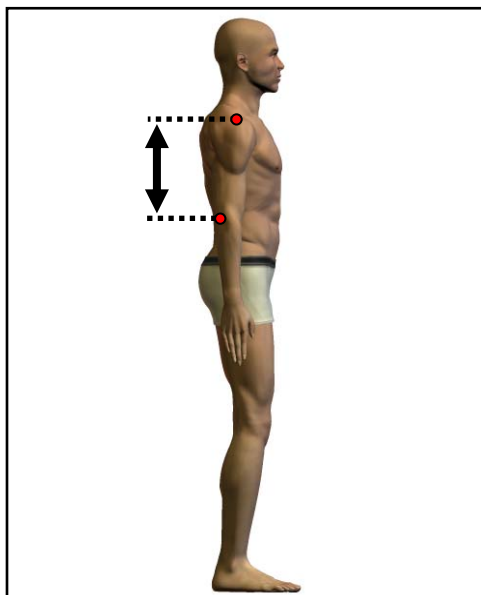
FEMALES		
<u>CM</u>		<u>IN</u>
133.12	MEAN	52.41
0.22	STD ERROR (MEAN)	0.09
5.55	STANDARD DEVIATION	2.18
0.16	STD ERROR (STD DEV)	0.06
118.50	MINIMUM	46.65
149.30	MAXIMUM	58.78
SKEWNESS		0.16
KURTOSIS		2.74
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
143.37	MEAN	56.45
0.18	STD ERROR (MEAN)	0.07
6.38	STANDARD DEVIATION	2.51
0.13	STD ERROR (STD DEV)	0.05
123.60	MINIMUM	48.66
164.60	MAXIMUM	64.80
SKEWNESS		0.22
KURTOSIS		2.99
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.16	1	0.16	118.25	-	119.75					
2	0.32	3	0.48	119.75	-	121.25					
11	1.77	14	2.26	121.25	-	122.75					
18	2.90	32	5.16	122.75	-	124.25	1	0.08	1	0.08	
26	4.19	58	9.35	124.25	-	125.75	2	0.15	3	0.23	
43	6.94	101	16.29	125.75	-	127.25	2	0.15	5	0.38	
42	6.77	143	23.06	127.25	-	128.75	2	0.15	7	0.54	
50	8.06	193	31.13	128.75	-	130.25	6	0.46	13	1.00	
55	8.87	248	40.00	130.25	-	131.75	16	1.23	29	2.23	
57	9.19	305	49.19	131.75	-	133.25	38	2.92	67	5.15	
85	13.71	390	62.90	133.25	-	134.75	42	3.23	109	8.38	
57	9.19	447	72.10	134.75	-	136.25	65	5.00	174	13.37	
47	7.58	494	79.68	136.25	-	137.75	77	5.92	251	19.29	
44	7.10	538	86.77	137.75	-	139.25	89	6.84	340	26.13	
26	4.19	564	90.97	139.25	-	140.75	112	8.61	452	34.74	
18	2.90	582	93.87	140.75	-	142.25	139	10.68	591	45.43	
15	2.42	597	96.29	142.25	-	143.75	118	9.07	709	54.50	
14	2.26	611	98.55	143.75	-	145.25	121	9.30	830	63.80	
3	0.48	614	99.03	145.25	-	146.75	92	7.07	922	70.87	
3	0.48	617	99.52	146.75	-	148.25	95	7.30	1017	78.17	
3	0.48	620	100.00	148.25	-	149.75	78	6.00	1095	84.17	
				149.75	-	151.25	53	4.07	1148	88.24	
				151.25	-	152.75	48	3.69	1196	91.93	
				152.75	-	154.25	39	3.00	1235	94.93	
				154.25	-	155.75	29	2.23	1264	97.16	
				155.75	-	157.25	13	1.00	1277	98.16	
				157.25	-	158.75	7	0.54	1284	98.69	
				158.75	-	160.25	9	0.69	1293	99.39	
				160.25	-	161.75	2	0.15	1295	99.54	
				161.75	-	163.25	3	0.23	1298	99.77	
				163.25	-	164.75	3	0.23	1301	100.00	

(3) ACROMION-RADIALE LENGTH

The distance between the right acromion landmark and the radiale landmark is measured with a beam caliper held parallel to the long axis of the arm. The participant stands erect. The shoulders and upper extremities are relaxed with the palms facing the thighs.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
27.72	10.92	1ST	29.40	11.57
28.00	11.02	2ND	29.90	11.77
28.30	11.14	3RD	30.30	11.93
28.51	11.22	5TH	30.80	12.13
29.10	11.46	10TH	31.30	12.32
29.40	11.57	15TH	31.70	12.48
29.70	11.69	20TH	32.00	12.60
30.00	11.81	25TH	32.40	12.76
30.20	11.89	30TH	32.60	12.83
30.50	12.01	35TH	32.80	12.91
30.70	12.09	40TH	33.00	12.99
31.00	12.20	45TH	33.20	13.07
31.10	12.24	50TH	33.40	13.15
31.30	12.32	55TH	33.60	13.23
31.46	12.38	60TH	33.80	13.31
31.67	12.47	65TH	34.10	13.43
31.90	12.56	70TH	34.40	13.54
32.10	12.64	75TH	34.60	13.62
32.40	12.76	80TH	34.90	13.74
32.70	12.87	85TH	35.30	13.90
33.00	12.99	90TH	35.60	14.02
33.70	13.27	95TH	36.40	14.33
34.14	13.44	97TH	36.90	14.53
34.66	13.64	98TH	37.20	14.65
35.20	13.86	99TH	37.70	14.84

(3) ACROMION-RADIALE LENGTH

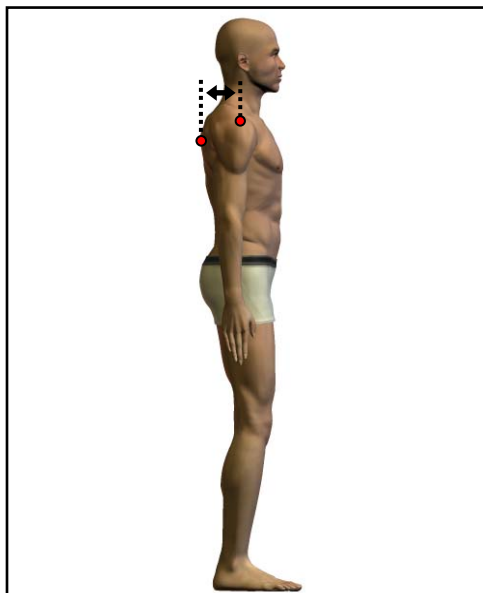
FEMALES		
<u>CM</u>		<u>IN</u>
31.09	MEAN	12.24
0.06	STD ERROR (MEAN)	0.02
1.56	STANDARD DEVIATION	0.61
0.04	STD ERROR (STD DEV)	0.02
27.10	MINIMUM	10.67
36.30	MAXIMUM	14.29
SKEWNESS		0.18
KURTOSIS		2.97
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
33.48	MEAN	13.18
0.05	STD ERROR (MEAN)	0.02
1.73	STANDARD DEVIATION	0.68
0.03	STD ERROR (STD DEV)	0.01
28.50	MINIMUM	11.22
39.90	MAXIMUM	15.71
SKEWNESS		0.10
KURTOSIS		3.09
COEFFICIENT OF VARIATION		5.2%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	26.75	-	27.25					
5	0.81	6	0.97	27.25	-	27.75					
11	1.77	17	2.74	27.75	-	28.25					
23	3.71	40	6.45	28.25	-	28.75		4	0.31	4	0.31
35	5.65	75	12.10	28.75	-	29.25		7	0.54	11	0.85
54	8.71	129	20.81	29.25	-	29.75		10	0.77	21	1.61
62	10.00	191	30.81	29.75	-	30.25		14	1.08	35	2.69
69	11.13	260	41.94	30.25	-	30.75		29	2.23	64	4.92
80	12.90	340	54.84	30.75	-	31.25		59	4.53	123	9.45
75	12.10	415	66.94	31.25	-	31.75		83	6.38	206	15.83
63	10.16	478	77.10	31.75	-	32.25		101	7.76	307	23.60
55	8.87	533	85.97	32.25	-	32.75		126	9.68	433	33.28
42	6.77	575	92.74	32.75	-	33.25		166	12.76	599	46.04
18	2.90	593	95.65	33.25	-	33.75		159	12.22	758	58.26
10	1.61	603	97.26	33.75	-	34.25		124	9.53	882	67.79
7	1.13	610	98.39	34.25	-	34.75		124	9.53	1006	77.33
6	0.97	616	99.35	34.75	-	35.25		94	7.23	1100	84.55
2	0.32	618	99.68	35.25	-	35.75		86	6.61	1186	91.16
1	0.16	619	99.84	35.75	-	36.25		35	2.69	1221	93.85
1	0.16	620	100.00	36.25	-	36.75		36	2.77	1257	96.62
				36.75	-	37.25		19	1.46	1276	98.08
				37.25	-	37.75		14	1.08	1290	99.15
				37.75	-	38.25		9	0.69	1299	99.85
				38.25	-	38.75		0	0.00	1299	99.85
				38.75	-	39.25		1	0.08	1300	99.92
				39.25	-	39.75		0	0.00	1300	99.92
				39.75	-	40.25		1	0.08	1301	100.00

(4) ACROMION-WALL DEPTH

The horizontal distance from a vertical surface to the right acromion landmark is measured with a modified height gauge. The participant stands fully erect with shoulder blades and buttocks firmly against a vertical surface with equal pressure exerted by the shoulders against the vertical surface. The feet are together and the heels are on a marked line 20 cm from the wall. The arms are relaxed at the sides.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
7.14	2.81	1ST	8.30	3.27
7.54	2.97	2ND	8.90	3.50
8.03	3.16	3RD	9.31	3.66
8.50	3.35	5TH	9.71	3.82
9.00	3.54	10TH	10.32	4.07
9.60	3.78	15TH	10.73	4.22
9.90	3.90	20TH	11.10	4.37
10.30	4.06	25TH	11.40	4.49
10.50	4.13	30TH	11.60	4.57
10.70	4.21	35TH	11.80	4.65
10.90	4.29	40TH	12.08	4.75
11.10	4.37	45TH	12.30	4.84
11.40	4.49	50TH	12.50	4.92
11.60	4.57	55TH	12.70	5.00
11.80	4.65	60TH	12.90	5.08
12.00	4.72	65TH	13.10	5.16
12.30	4.84	70TH	13.40	5.28
12.50	4.92	75TH	13.60	5.35
12.80	5.04	80TH	13.90	5.47
13.10	5.16	85TH	14.20	5.59
13.50	5.31	90TH	14.70	5.79
14.10	5.55	95TH	15.20	5.98
14.34	5.64	97TH	15.59	6.14
14.66	5.77	98TH	15.90	6.26
15.28	6.01	99TH	16.40	6.46

(4) ACROMION-WALL DEPTH

FEMALES		
CM		IN
11.33	MEAN	4.46
0.07	STD ERROR (MEAN)	0.03
1.70	STANDARD DEVIATION	0.67
0.05	STD ERROR (STD DEV)	0.02
6.00	MINIMUM	2.36
16.30	MAXIMUM	6.42
SKEWNESS		-0.12
KURTOSIS		3.01
COEFFICIENT OF VARIATION		15.0%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
12.48	MEAN	4.91
0.05	STD ERROR (MEAN)	0.02
1.68	STANDARD DEVIATION	0.66
0.03	STD ERROR (STD DEV)	0.01
6.00	MINIMUM	2.36
17.70	MAXIMUM	6.97
SKEWNESS		-0.12
KURTOSIS		3.16
COEFFICIENT OF VARIATION		13.5%
NUMBER OF PARTICIPANTS		1301

FEMALES				MALES			
E	FPct	CumF	CumFPct	CM	E	FPct	CumF
1	0.16	1	0.16	5.85	-	0.08	1
1	0.16	2	0.32	6.10	-	0.08	2
0	0.00	2	0.32	6.35	-	0.00	2
2	0.32	4	0.65	6.60	-	0.00	2
1	0.16	5	0.81	6.85	-	0.08	3
4	0.65	9	1.45	7.10	-	0.15	5
3	0.48	12	1.94	7.35	-	0.00	5
2	0.32	14	2.26	7.60	-	0.08	6
4	0.65	18	2.90	7.85	-	0.08	7
8	1.29	26	4.19	8.10	-	0.54	14
10	1.61	36	5.81	8.35	-	0.23	17
16	2.58	52	8.39	8.60	-	0.46	23
13	2.10	65	10.48	8.85	-	0.38	28
11	1.77	76	12.26	9.10	-	0.85	39
14	2.26	90	14.52	9.35	-	0.77	49
25	4.03	115	18.55	9.60	-	2.08	76
20	3.23	135	21.77	9.85	-	1.31	93
32	5.16	167	26.94	10.10	-	2.84	130
32	5.16	199	32.10	10.35	-	1.92	155
35	5.65	234	37.74	10.60	-	4.53	214
33	5.32	267	43.06	10.85	-	3.07	254
41	6.61	308	49.68	11.10	-	4.61	314
28	4.52	336	54.19	11.35	-	4.15	368
49	7.90	385	62.10	11.60	-	7.30	463
23	3.71	408	65.81	11.85	-	4.38	520
41	6.61	449	72.42	12.10	-	6.84	609
28	4.52	477	76.94	12.35	-	4.84	672
27	4.35	504	81.29	12.60	-	5.69	746
20	3.23	524	84.52	12.85	-	5.84	822
27	4.35	551	88.87	13.10	-	6.61	908
10	1.61	561	90.48	13.35	-	4.07	961
15	2.42	576	92.90	13.60	-	5.76	1036
12	1.94	588	94.84	13.85	-	3.15	1077
14	2.26	602	97.10	14.10	-	4.30	1133
4	0.65	606	97.74	14.35	-	2.00	1159
4	0.65	610	98.39	14.60	-	2.61	1193
3	0.48	613	98.87	14.85	-	2.00	1219
2	0.32	615	99.19	15.10	-	2.23	1248
1	0.16	616	99.35	15.35	-	1.08	1262
2	0.32	618	99.68	15.60	-	1.00	1275
1	0.16	619	99.84	15.85	-	0.54	1282
1	0.16	620	100.00	16.10	-	0.38	1287
				16.35	-	0.46	1293
				16.60	-	0.31	1297
				16.85	-	0.23	1300
				17.10	-	0.00	1300
				17.35	-	0.00	1300
				17.60	-	0.08	1301

(5) ANKLE CIRCUMFERENCE

The minimum horizontal circumference of the right ankle is measured with a tape. The participant stands with the feet about 10 cm apart and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
18.62	7.33	1ST	19.80	7.80
18.90	7.44	2ND	20.00	7.87
19.00	7.48	3RD	20.20	7.95
19.30	7.60	5TH	20.50	8.07
19.70	7.76	10TH	21.00	8.27
20.00	7.87	15TH	21.30	8.39
20.20	7.95	20TH	21.50	8.46
20.33	8.00	25TH	21.80	8.58
20.50	8.07	30TH	22.00	8.66
20.70	8.15	35TH	22.10	8.70
20.80	8.19	40TH	22.30	8.78
21.00	8.27	45TH	22.50	8.86
21.10	8.31	50TH	22.70	8.94
21.26	8.37	55TH	22.80	8.98
21.40	8.43	60TH	23.00	9.06
21.60	8.50	65TH	23.20	9.13
21.80	8.58	70TH	23.40	9.21
22.00	8.66	75TH	23.60	9.29
22.20	8.74	80TH	23.80	9.37
22.49	8.85	85TH	24.10	9.49
22.70	8.94	90TH	24.50	9.65
23.10	9.09	95TH	25.00	9.84
23.40	9.21	97TH	25.30	9.96
23.66	9.31	98TH	25.50	10.04
24.08	9.48	99TH	26.00	10.24

(5) ANKLE CIRCUMFERENCE

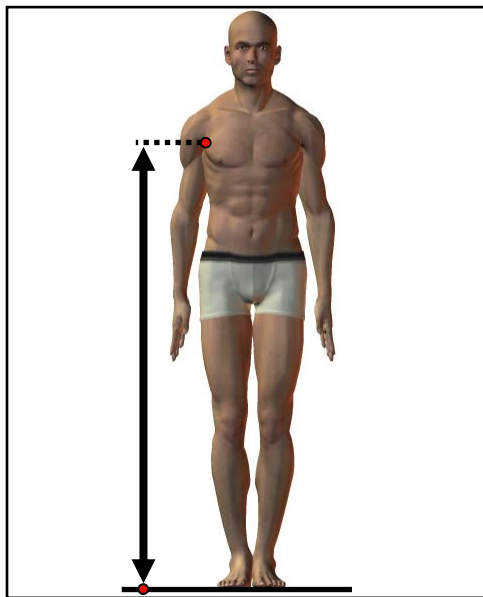
FEMALES		
CM		IN
21.18	MEAN	8.34
0.05	STD ERROR (MEAN)	0.02
1.18	STANDARD DEVIATION	0.46
0.03	STD ERROR (STD DEV)	0.01
17.80	MINIMUM	7.01
27.60	MAXIMUM	10.87
SKEWNESS		0.36
KURTOSIS		4.05
COEFFICIENT OF VARIATION		5.6%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
22.69	MEAN	8.93
0.04	STD ERROR (MEAN)	0.01
1.36	STANDARD DEVIATION	0.53
0.03	STD ERROR (STD DEV)	0.01
19.00	MINIMUM	7.48
28.30	MAXIMUM	11.14
SKEWNESS		0.21
KURTOSIS		3.09
COEFFICIENT OF VARIATION		6.0%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	17.60	-	17.85					
1	0.16	2	0.32	17.85	-	18.10					
0	0.00	2	0.32	18.10	-	18.35					
3	0.48	5	0.81	18.35	-	18.60					
5	0.81	10	1.61	18.60	-	18.85					
9	1.45	19	3.06	18.85	-	19.10		1	0.08	1	0.08
13	2.10	32	5.16	19.10	-	19.35		1	0.08	2	0.15
16	2.58	48	7.74	19.35	-	19.60		5	0.38	3	0.54
27	4.35	75	12.10	19.60	-	19.85		8	0.62	8	1.15
28	4.52	103	16.61	19.85	-	20.10		13	1.00	16	2.15
52	8.39	155	25.00	20.10	-	20.35		19	1.46	29	3.62
40	6.45	195	31.45	20.35	-	20.60		28	2.15	48	5.77
57	9.19	252	40.65	20.60	-	20.85		38	2.92	76	8.69
40	6.45	292	47.10	20.85	-	21.10		40	3.08	114	11.77
72	11.61	364	58.71	21.10	-	21.35		58	4.46	154	16.23
37	5.97	401	64.68	21.35	-	21.60		62	4.77	212	21.00
45	7.26	446	71.94	21.60	-	21.85		89	6.85	274	27.85
30	4.84	476	76.77	21.85	-	22.10		71	5.46	363	33.31
43	6.94	519	83.71	22.10	-	22.35		104	8.00	434	41.31
24	3.87	543	87.58	22.35	-	22.60		72	5.54	538	46.85
32	5.16	575	92.74	22.60	-	22.85		113	8.69	610	55.54
14	2.26	589	95.00	22.85	-	23.10		80	6.15	723	61.69
12	1.94	601	96.94	23.10	-	23.35		101	7.77	803	69.46
5	0.81	606	97.74	23.35	-	23.60		66	5.08	904	74.54
5	0.81	611	98.55	23.60	-	23.85		73	5.62	970	80.15
3	0.48	614	99.03	23.85	-	24.10		53	4.08	1043	84.23
2	0.32	616	99.35	24.10	-	24.35		58	4.46	1096	88.69
1	0.16	617	99.52	24.35	-	24.60		41	3.15	1154	91.85
2	0.32	619	99.84	24.60	-	24.85		30	2.31	1195	94.15
0	0.00	619	99.84	24.85	-	25.10		17	1.31	1225	95.46
0	0.00	619	99.84	25.10	-	25.35		21	1.62	1242	97.08
0	0.00	619	99.84	25.35	-	25.60		15	1.15	1263	98.23
0	0.00	619	99.84	25.60	-	25.85		9	0.69	1278	98.92
0	0.00	619	99.84	25.85	-	26.10		4	0.31	1287	99.23
0	0.00	619	99.84	26.10	-	26.35		2	0.15	1291	99.38
0	0.00	619	99.84	26.35	-	26.60		4	0.31	1293	99.69
0	0.00	619	99.84	26.60	-	26.85		0	0.00	1297	99.69
0	0.00	619	99.84	26.85	-	27.10		1	0.08	1297	99.77
0	0.00	619	99.84	27.10	-	27.35		0	0.00	1298	99.77
0	0.00	619	99.84	27.35	-	27.60		0	0.00	1298	99.77
1	0.16	620	100.00	27.60	-	27.85		2	0.15	1298	99.92
				27.85	-	28.10		0	0.00	1300	99.92
				28.10	-	28.35		1	0.08	1300	100.00

(6) AXILLA HEIGHT

The vertical distance between a standing surface and the anterior-scye-on-the-torso landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed with the palms facing the thighs. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
112.05	44.12	1ST	120.20	47.32
113.24	44.59	2ND	121.20	47.72
114.20	44.96	3RD	122.10	48.07
115.11	45.31	5TH	123.00	48.43
116.40	45.83	10TH	125.10	49.25
117.70	46.34	15TH	126.30	49.72
118.60	46.69	20TH	127.60	50.24
119.75	47.15	25TH	128.60	50.63
120.80	47.56	30TH	129.40	50.94
121.50	47.83	35TH	130.30	51.30
122.30	48.15	40TH	131.00	51.57
123.00	48.43	45TH	131.60	51.81
123.80	48.74	50TH	132.40	52.13
124.36	48.96	55TH	133.10	52.40
124.86	49.15	60TH	133.92	52.73
125.60	49.45	65TH	134.70	53.03
126.30	49.72	70TH	135.60	53.39
127.00	50.00	75TH	136.60	53.78
128.18	50.46	80TH	137.70	54.21
129.00	50.79	85TH	139.00	54.72
130.60	51.42	90TH	140.68	55.38
132.49	52.17	95TH	143.19	56.38
133.81	52.68	97TH	144.70	56.97
134.56	52.97	98TH	145.60	57.32
136.67	53.81	99TH	147.20	57.95

(6) AXILLA HEIGHT

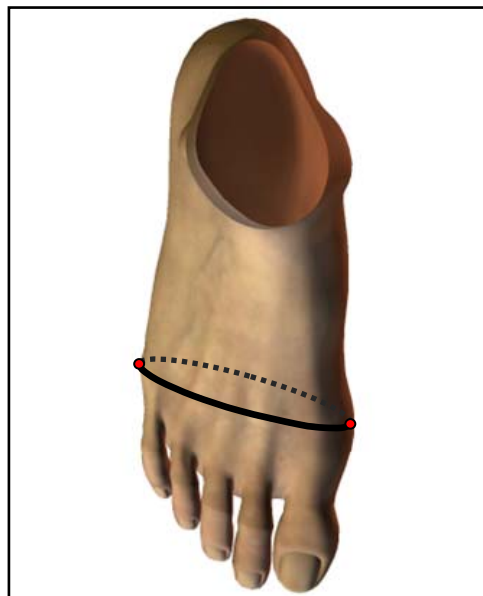
FEMALES		
CM		IN
123.56	MEAN	48.65
0.21	STD ERROR (MEAN)	0.08
5.31	STANDARD DEVIATION	2.09
0.15	STD ERROR (STD DEV)	0.06
108.70	MINIMUM	42.80
139.20	MAXIMUM	54.80
SKEWNESS		0.11
KURTOSIS		2.79
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
132.67	MEAN	52.23
0.17	STD ERROR (MEAN)	0.07
6.01	STANDARD DEVIATION	2.37
0.12	STD ERROR (STD DEV)	0.05
111.90	MINIMUM	44.06
152.20	MAXIMUM	59.92
SKEWNESS		0.19
KURTOSIS		3.01
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	108.55	-	109.55					
1	0.16	2	0.32	109.55	-	110.55					
1	0.16	3	0.48	110.55	-	111.55					
3	0.48	6	0.97	111.55	-	112.55		1	0.08	1	0.08
7	1.13	13	2.10	112.55	-	113.55		0	0.00	1	0.08
12	1.94	25	4.03	113.55	-	114.55		0	0.00	1	0.08
15	2.42	40	6.45	114.55	-	115.55		0	0.00	1	0.08
25	4.03	65	10.48	115.55	-	116.55		4	0.31	5	0.38
26	4.19	91	14.68	116.55	-	117.55		1	0.08	6	0.46
31	5.00	122	19.68	117.55	-	118.55		1	0.08	7	0.54
25	4.03	147	23.71	118.55	-	119.55		3	0.23	10	0.77
30	4.84	177	28.55	119.55	-	120.55		5	0.38	15	1.15
41	6.61	218	35.16	120.55	-	121.55		14	1.08	29	2.23
42	6.77	260	41.94	121.55	-	122.55		22	1.69	51	3.92
42	6.77	302	48.71	122.55	-	123.55		25	1.92	76	5.84
52	8.39	354	57.10	123.55	-	124.55		39	3.00	115	8.84
48	7.74	402	64.84	124.55	-	125.55		35	2.69	150	11.53
43	6.94	445	71.77	125.55	-	126.55		60	4.61	210	16.14
39	6.29	484	78.06	126.55	-	127.55		48	3.69	258	19.83
28	4.52	512	82.58	127.55	-	128.55		61	4.69	319	24.52
31	5.00	543	87.58	128.55	-	129.55		82	6.30	401	30.82
14	2.26	557	89.84	129.55	-	130.55		74	5.69	475	36.51
20	3.23	577	93.06	130.55	-	131.55		107	8.22	582	44.73
14	2.26	591	95.32	131.55	-	132.55		75	5.76	657	50.50
8	1.29	599	96.61	132.55	-	133.55		96	7.38	753	57.88
9	1.45	608	98.06	133.55	-	134.55		75	5.76	828	63.64
4	0.65	612	98.71	134.55	-	135.55		82	6.30	910	69.95
2	0.32	614	99.03	135.55	-	136.55		62	4.77	972	74.71
1	0.16	615	99.19	136.55	-	137.55		61	4.69	1033	79.40
2	0.32	617	99.52	137.55	-	138.55		48	3.69	1081	83.09
3	0.48	620	100.00	138.55	-	139.55		50	3.84	1131	86.93
				139.55	-	140.55		36	2.77	1167	89.70
				140.55	-	141.55		30	2.31	1197	92.01
				141.55	-	142.55		27	2.08	1224	94.08
				142.55	-	143.55		22	1.69	1246	95.77
				143.55	-	144.55		15	1.15	1261	96.93
				144.55	-	145.55		13	1.00	1274	97.92
				145.55	-	146.55		10	0.77	1284	98.69
				146.55	-	147.55		6	0.46	1290	99.15
				147.55	-	148.55		4	0.31	1294	99.46
				148.55	-	149.55		1	0.08	1295	99.54
				149.55	-	150.55		2	0.15	1297	99.69
				150.55	-	151.55		1	0.08	1298	99.77
				151.55	-	152.55		3	0.23	1301	100.00

(7) BALL OF FOOT CIRCUMFERENCE

The circumference of the foot at the first and fifth metatarsophalangeal landmarks is measured with a tape. The participant stands with the feet about 10 cm apart and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
20.30	7.99	1ST	22.30	8.78
20.70	8.15	2ND	22.50	8.86
20.80	8.19	3RD	22.80	8.98
21.00	8.27	5TH	23.10	9.09
21.40	8.43	10TH	23.60	9.29
21.60	8.50	15TH	23.90	9.41
21.80	8.58	20TH	24.10	9.49
22.00	8.66	25TH	24.30	9.57
22.10	8.70	30TH	24.50	9.65
22.20	8.74	35TH	24.60	9.69
22.30	8.78	40TH	24.80	9.76
22.50	8.86	45TH	25.00	9.84
22.60	8.90	50TH	25.10	9.88
22.80	8.98	55TH	25.30	9.96
22.90	9.02	60TH	25.50	10.04
23.00	9.06	65TH	25.70	10.12
23.20	9.13	70TH	25.80	10.16
23.40	9.21	75TH	26.00	10.24
23.60	9.29	80TH	26.20	10.31
23.80	9.37	85TH	26.50	10.43
24.00	9.45	90TH	26.80	10.55
24.50	9.65	95TH	27.40	10.79
24.60	9.69	97TH	27.70	10.91
24.80	9.76	98TH	27.90	10.98
25.44	10.01	99TH	28.50	11.22

(7) BALL OF FOOT CIRCUMFERENCE

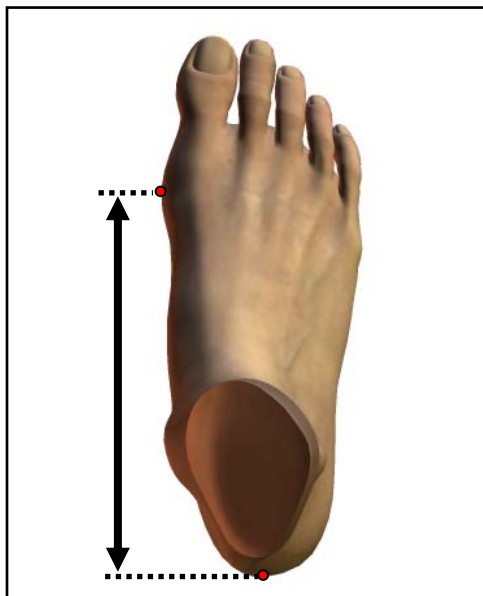
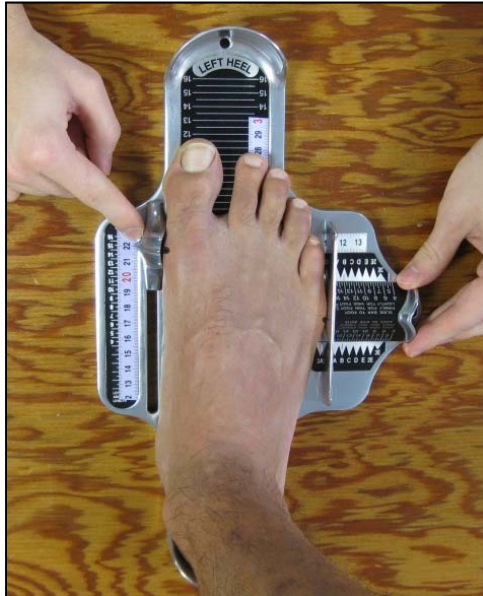
FEMALES		
CM		IN
22.67	MEAN	8.92
0.04	STD ERROR (MEAN)	0.02
1.05	STANDARD DEVIATION	0.41
0.03	STD ERROR (STD DEV)	0.01
18.90	MINIMUM	7.44
25.90	MAXIMUM	10.20
SKEWNESS		0.10
KURTOSIS		3.14
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
25.19	MEAN	9.92
0.04	STD ERROR (MEAN)	0.01
1.29	STANDARD DEVIATION	0.51
0.03	STD ERROR (STD DEV)	0.01
21.50	MINIMUM	8.46
30.30	MAXIMUM	11.93
SKEWNESS		0.19
KURTOSIS		3.26
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	18.85	-	19.10					
0	0.00	1	0.16	19.10	-	19.35					
1	0.16	2	0.32	19.35	-	19.60					
1	0.16	3	0.48	19.60	-	19.85					
1	0.16	4	0.65	19.85	-	20.10					
3	0.48	7	1.13	20.10	-	20.35					
3	0.48	10	1.61	20.35	-	20.60					
14	2.26	24	3.87	20.60	-	20.85					
8	1.29	32	5.16	20.85	-	21.10					
24	3.87	56	9.03	21.10	-	21.35					
33	5.32	89	14.35	21.35	-	21.60		4	0.31	4	0.31
51	8.23	140	22.58	21.60	-	21.85		2	0.15	6	0.46
39	6.29	179	28.87	21.85	-	22.10		3	0.23	9	0.69
71	11.45	250	40.32	22.10	-	22.35		5	0.38	14	1.08
42	6.77	292	47.10	22.35	-	22.60		13	1.00	27	2.08
70	11.29	362	58.39	22.60	-	22.85		13	1.00	40	3.07
47	7.58	409	65.97	22.85	-	23.10		23	1.77	63	4.84
50	8.06	459	74.03	23.10	-	23.35		30	2.31	93	7.15
32	5.16	491	79.19	23.35	-	23.60		31	2.38	124	9.53
49	7.90	540	87.10	23.60	-	23.85		63	4.84	187	14.37
20	3.23	560	90.32	23.85	-	24.10		50	3.84	237	18.22
24	3.87	584	94.19	24.10	-	24.35		103	7.92	340	26.13
13	2.10	597	96.29	24.35	-	24.60		81	6.23	421	32.36
12	1.94	609	98.23	24.60	-	24.85		113	8.69	534	41.05
3	0.48	612	98.71	24.85	-	25.10		77	5.92	611	46.96
2	0.32	614	99.03	25.10	-	25.35		116	8.92	727	55.88
2	0.32	616	99.35	25.35	-	25.60		85	6.53	812	62.41
2	0.32	618	99.68	25.60	-	25.85		113	8.69	925	71.10
2	0.32	620	100.00	25.85	-	26.10		75	5.76	1000	76.86
				26.10	-	26.35		74	5.69	1074	82.55
				26.35	-	26.60		47	3.61	1121	86.16
				26.60	-	26.85		53	4.07	1174	90.24
				26.85	-	27.10		25	1.92	1199	92.16
				27.10	-	27.35		32	2.46	1231	94.62
				27.35	-	27.60		16	1.23	1247	95.85
				27.60	-	27.85		26	2.00	1273	97.85
				27.85	-	28.10		5	0.38	1278	98.23
				28.10	-	28.35		8	0.61	1286	98.85
				28.35	-	28.60		3	0.23	1289	99.08
				28.60	-	28.85		7	0.54	1296	99.62
				28.85	-	29.10		1	0.08	1297	99.69
				29.10	-	29.35		1	0.08	1298	99.77
				29.35	-	29.60		1	0.08	1299	99.85
				29.60	-	29.85		1	0.08	1300	99.92
				29.85	-	30.10		0	0.00	1300	99.92
				30.10	-	30.35		1	0.08	1301	100.00

(8) BALL OF FOOT LENGTH

The distance from the back of the heel to the landmark at the first metatarsophalangeal protrusion is measured with the Brannock device. The participant stands erect with the right foot in the Brannock device and the other foot on a board of equal height. The weight is distributed equally on both feet. The medial side of the right foot is parallel with the long axis of the device.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
16.00	6.30	1ST	18.00	7.09
16.34	6.44	2ND	18.20	7.17
16.50	6.50	3RD	18.20	7.17
16.70	6.57	5TH	18.50	7.28
17.00	6.69	10TH	18.70	7.36
17.10	6.73	15TH	18.90	7.44
17.30	6.81	20TH	19.10	7.52
17.40	6.85	25TH	19.30	7.60
17.50	6.89	30TH	19.50	7.68
17.70	6.97	35TH	19.60	7.72
17.80	7.01	40TH	19.80	7.80
17.90	7.05	45TH	19.90	7.83
18.00	7.09	50TH	20.00	7.87
18.16	7.15	55TH	20.20	7.95
18.30	7.20	60TH	20.30	7.99
18.47	7.27	65TH	20.40	8.03
18.60	7.32	70TH	20.50	8.07
18.70	7.36	75TH	20.70	8.15
18.90	7.44	80TH	20.90	8.23
19.00	7.48	85TH	21.10	8.31
19.30	7.60	90TH	21.40	8.43
19.60	7.72	95TH	21.70	8.54
19.84	7.81	97TH	22.00	8.66
20.10	7.91	98TH	22.20	8.74
20.50	8.07	99TH	22.40	8.82

(8) BALL OF FOOT LENGTH

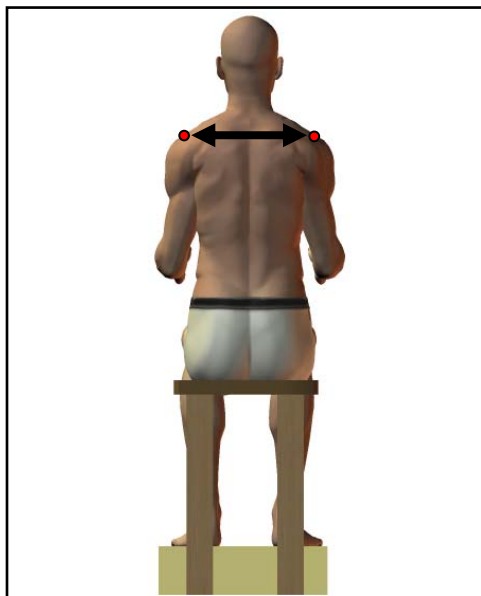
FEMALES		
CM		IN
18.09	MEAN	7.12
0.04	STD ERROR (MEAN)	0.01
0.93	STANDARD DEVIATION	0.37
0.03	STD ERROR (STD DEV)	0.01
15.30	MINIMUM	6.02
21.80	MAXIMUM	8.58
SKEWNESS		0.26
KURTOSIS		3.28
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
20.03	MEAN	7.89
0.03	STD ERROR (MEAN)	0.01
1.01	STANDARD DEVIATION	0.40
0.02	STD ERROR (STD DEV)	0.01
17.40	MINIMUM	6.85
23.70	MAXIMUM	9.33
SKEWNESS		0.16
KURTOSIS		2.72
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		1299

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	15.15	-	15.35					
1	0.16	2	0.32	15.35	-	15.55					
1	0.16	3	0.48	15.55	-	15.75					
1	0.16	4	0.65	15.75	-	15.95					
5	0.81	9	1.45	15.95	-	16.15					
3	0.48	12	1.94	16.15	-	16.35					
10	1.61	22	3.55	16.35	-	16.55					
19	3.06	41	6.61	16.55	-	16.75					
18	2.90	59	9.52	16.75	-	16.95					
35	5.65	94	15.16	16.95	-	17.15					
42	6.77	136	21.94	17.15	-	17.35					
52	8.39	188	30.32	17.35	-	17.55		4	0.31	4	0.31
53	8.55	241	38.87	17.55	-	17.75		1	0.08	5	0.38
42	6.77	283	45.65	17.75	-	17.95		7	0.54	12	0.92
58	9.35	341	55.00	17.95	-	18.15		13	1.00	25	1.92
42	6.77	383	61.77	18.15	-	18.35		26	2.00	51	3.93
48	7.74	431	69.52	18.35	-	18.55		32	2.46	83	6.39
39	6.29	470	75.81	18.55	-	18.75		54	4.16	137	10.55
36	5.81	506	81.61	18.75	-	18.95		63	4.85	200	15.40
32	5.16	538	86.77	18.95	-	19.15		70	5.39	270	20.79
25	4.03	563	90.81	19.15	-	19.35		83	6.39	353	27.17
23	3.71	586	94.52	19.35	-	19.55		78	6.00	431	33.18
14	2.26	600	96.77	19.55	-	19.75		86	6.62	517	39.80
7	1.13	607	97.90	19.75	-	19.95		96	7.39	613	47.19
2	0.32	609	98.23	19.95	-	20.15		94	7.24	707	54.43
3	0.48	612	98.71	20.15	-	20.35		110	8.47	817	62.89
4	0.65	616	99.35	20.35	-	20.55		95	7.31	912	70.21
0	0.00	616	99.35	20.55	-	20.75		78	6.00	990	76.21
2	0.32	618	99.68	20.75	-	20.95		64	4.93	1054	81.14
1	0.16	619	99.84	20.95	-	21.15		54	4.16	1108	85.30
0	0.00	619	99.84	21.15	-	21.35		56	4.31	1164	89.61
0	0.00	619	99.84	21.35	-	21.55		47	3.62	1211	93.23
0	0.00	619	99.84	21.55	-	21.75		33	2.54	1244	95.77
1	0.16	620	100.00	21.75	-	21.95		16	1.23	1260	97.00
				21.95	-	22.15		11	0.85	1271	97.84
				22.15	-	22.35		13	1.00	1284	98.85
				22.35	-	22.55		8	0.62	1292	99.46
				22.55	-	22.75		2	0.15	1294	99.62
				22.75	-	22.95		1	0.08	1295	99.69
				22.95	-	23.15		3	0.23	1298	99.92
				23.15	-	23.35		0	0.00	1298	99.92
				23.35	-	23.55		0	0.00	1298	99.92
				23.55	-	23.75		1	0.08	1299	100.00

(9) BIACROMIAL BREADTH

The distance between the right and left acromion landmarks is measured with a beam caliper. The participant sits erect. The shoulders and upper arms are relaxed, and the forearms and hands are extended forward horizontally with the palms facing each other. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
31.92	12.57	1ST	36.10	14.21
32.54	12.81	2ND	36.70	14.45
32.80	12.91	3RD	37.10	14.61
33.00	12.99	5TH	37.60	14.80
33.80	13.31	10TH	38.40	15.12
34.20	13.46	15TH	38.90	15.31
34.50	13.58	20TH	39.20	15.43
34.70	13.66	25TH	39.50	15.55
35.00	13.78	30TH	39.80	15.67
35.30	13.90	35TH	40.10	15.79
35.60	14.02	40TH	40.40	15.91
35.70	14.06	45TH	40.60	15.98
35.90	14.13	50TH	40.85	16.08
36.10	14.21	55TH	41.20	16.22
36.24	14.27	60TH	41.40	16.30
36.40	14.33	65TH	41.60	16.38
36.60	14.41	70TH	41.90	16.50
36.90	14.53	75TH	42.20	16.61
37.12	14.62	80TH	42.60	16.77
37.52	14.77	85TH	42.90	16.89
37.91	14.92	90TH	43.40	17.09
38.60	15.20	95TH	44.20	17.40
38.90	15.31	97TH	44.70	17.60
39.26	15.45	98TH	45.00	17.72
39.70	15.63	99TH	45.30	17.83

(9) BIACROMIAL BREADTH

FEMALES		
<u>CM</u>		<u>IN</u>
35.85	MEAN	14.11
0.07	STD ERROR (MEAN)	0.03
1.63	STANDARD DEVIATION	0.64
0.05	STD ERROR (STD DEV)	0.02
30.00	MINIMUM	11.81
40.40	MAXIMUM	15.91
SKEWNESS		-0.05
KURTOSIS		3.03
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		618

MALES		
<u>CM</u>		<u>IN</u>
40.88	MEAN	16.09
0.05	STD ERROR (MEAN)	0.02
1.97	STANDARD DEVIATION	0.78
0.04	STD ERROR (STD DEV)	0.02
35.30	MINIMUM	13.90
46.80	MAXIMUM	18.43
SKEWNESS		-0.01
KURTOSIS		2.91
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		<u>CM</u>			<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	29.75	-	30.25					
0	0.00	1	0.16	30.25	-	30.75					
0	0.00	1	0.16	30.75	-	31.25					
4	0.65	5	0.81	31.25	-	31.75					
5	0.81	10	1.62	31.75	-	32.25					
7	1.13	17	2.75	32.25	-	32.75					
17	2.75	34	5.50	32.75	-	33.25					
26	4.21	60	9.71	33.25	-	33.75					
41	6.63	101	16.34	33.75	-	34.25					
61	9.87	162	26.21	34.25	-	34.75					
52	8.41	214	34.63	34.75	-	35.25					
74	11.97	288	46.60	35.25	-	35.75		6	0.46	6	0.46
83	13.43	371	60.03	35.75	-	36.25		8	0.62	14	1.08
73	11.81	444	71.84	36.25	-	36.75		15	1.15	29	2.23
59	9.55	503	81.39	36.75	-	37.25		13	1.00	42	3.23
39	6.31	542	87.70	37.25	-	37.75		33	2.54	75	5.77
27	4.37	569	92.07	37.75	-	38.25		41	3.15	116	8.92
27	4.37	596	96.44	38.25	-	38.75		59	4.54	175	13.46
10	1.62	606	98.06	38.75	-	39.25		95	7.31	270	20.77
7	1.13	613	99.19	39.25	-	39.75		101	7.77	371	28.54
4	0.65	617	99.84	39.75	-	40.25		117	9.00	488	37.54
1	0.16	618	100.00	40.25	-	40.75		130	10.00	618	47.54
				40.75	-	41.25		130	10.00	748	57.54
				41.25	-	41.75		124	9.54	872	67.08
				41.75	-	42.25		113	8.69	985	75.77
				42.25	-	42.75		98	7.54	1083	83.31
				42.75	-	43.25		69	5.31	1152	88.62
				43.25	-	43.75		50	3.85	1202	92.46
				43.75	-	44.25		39	3.00	1241	95.46
				44.25	-	44.75		24	1.85	1265	97.31
				44.75	-	45.25		21	1.62	1286	98.92
				45.25	-	45.75		6	0.46	1292	99.38
				45.75	-	46.25		4	0.31	1296	99.69
				46.25	-	46.75		3	0.23	1299	99.92
				46.75	-	47.25		1	0.08	1300	100.00

(10) BICEPS CIRCUMFERENCE, FLEXED

The circumference of the right upper arm around the flexed biceps brachii muscle at the biceps point landmark is measured with a tape held perpendicular to the long axis of the upper arm. The participant stands with the upper arm extended horizontally and the elbow flexed 90°. The fist is clenched facing the head, and the participant exerts maximum effort in contracting the biceps brachii muscle.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
24.32	9.58	1ST	28.00	11.02
24.80	9.76	2ND	28.91	11.38
25.16	9.91	3RD	29.30	11.54
25.60	10.08	5TH	29.91	11.77
26.30	10.35	10TH	30.90	12.17
26.70	10.51	15TH	31.63	12.45
27.20	10.71	20TH	32.20	12.68
27.50	10.83	25TH	32.60	12.83
27.90	10.98	30TH	33.20	13.07
28.20	11.10	35TH	33.60	13.23
28.50	11.22	40TH	34.00	13.39
28.70	11.30	45TH	34.40	13.54
28.90	11.38	50TH	34.80	13.70
29.30	11.54	55TH	35.30	13.90
29.60	11.65	60TH	35.70	14.06
29.90	11.77	65TH	36.00	14.17
30.20	11.89	70TH	36.50	14.37
30.50	12.01	75TH	37.10	14.61
30.88	12.16	80TH	37.60	14.80
31.30	12.32	85TH	38.20	15.04
31.80	12.52	90TH	38.80	15.28
32.70	12.87	95TH	40.20	15.83
33.10	13.03	97TH	40.99	16.14
34.00	13.39	98TH	41.90	16.50
34.74	13.67	99TH	42.40	16.69

(10) BICEPS CIRCUMFERENCE, FLEXED

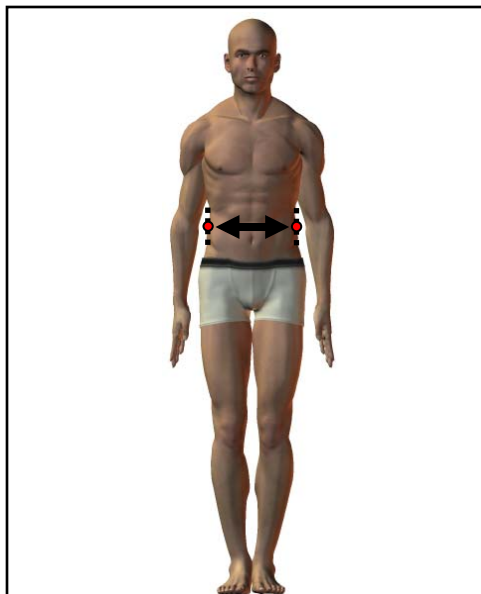
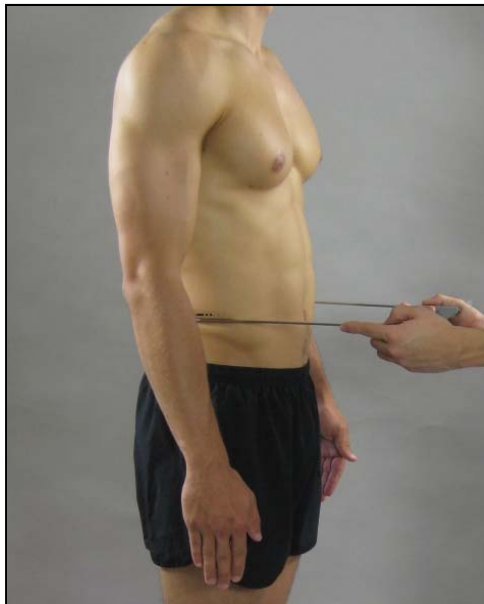
FEMALES		
CM		IN
29.07	MEAN	11.44
0.09	STD ERROR (MEAN)	0.03
2.19	STANDARD DEVIATION	0.86
0.06	STD ERROR (STD DEV)	0.02
23.20	MINIMUM	9.13
38.50	MAXIMUM	15.16
SKEWNESS		0.29
KURTOSIS		3.37
COEFFICIENT OF VARIATION		7.5%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
34.92	MEAN	13.75
0.09	STD ERROR (MEAN)	0.03
3.12	STANDARD DEVIATION	1.23
0.06	STD ERROR (STD DEV)	0.02
25.70	MINIMUM	10.12
47.70	MAXIMUM	18.78
SKEWNESS		0.19
KURTOSIS		2.99
COEFFICIENT OF VARIATION		8.9%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	22.75	-	23.25					
1	0.16	2	0.32	23.25	-	23.75					
2	0.32	4	0.65	23.75	-	24.25					
7	1.13	11	1.77	24.25	-	24.75					
9	1.45	20	3.23	24.75	-	25.25					
16	2.58	36	5.81	25.25	-	25.75		1	0.08	1	0.08
23	3.71	59	9.52	25.75	-	26.25		0	0.00	1	0.08
38	6.13	97	15.65	26.25	-	26.75		0	0.00	1	0.08
32	5.16	129	20.81	26.75	-	27.25		2	0.15	3	0.23
43	6.94	172	27.74	27.25	-	27.75		5	0.38	8	0.61
52	8.39	224	36.13	27.75	-	28.25		9	0.69	17	1.31
64	10.32	288	46.45	28.25	-	28.75		6	0.46	23	1.77
47	7.58	335	54.03	28.75	-	29.25		12	0.92	35	2.69
54	8.71	389	62.74	29.25	-	29.75		17	1.31	52	4.00
49	7.90	438	70.65	29.75	-	30.25		28	2.15	80	6.15
44	7.10	482	77.74	30.25	-	30.75		35	2.69	115	8.84
42	6.77	524	84.52	30.75	-	31.25		40	3.07	155	11.91
29	4.68	553	89.19	31.25	-	31.75		51	3.92	206	15.83
20	3.23	573	92.42	31.75	-	32.25		58	4.46	264	20.29
18	2.90	591	95.32	32.25	-	32.75		71	5.46	335	25.75
13	2.10	604	97.42	32.75	-	33.25		66	5.07	401	30.82
3	0.48	607	97.90	33.25	-	33.75		73	5.61	474	36.43
3	0.48	610	98.39	33.75	-	34.25		91	6.99	565	43.43
4	0.65	614	99.03	34.25	-	34.75		68	5.23	633	48.65
2	0.32	616	99.35	34.75	-	35.25		77	5.92	710	54.57
1	0.16	617	99.52	35.25	-	35.75		91	6.99	801	61.57
1	0.16	618	99.68	35.75	-	36.25		75	5.76	876	67.33
1	0.16	619	99.84	36.25	-	36.75		65	5.00	941	72.33
0	0.00	619	99.84	36.75	-	37.25		58	4.46	999	76.79
0	0.00	619	99.84	37.25	-	37.75		61	4.69	1060	81.48
0	0.00	619	99.84	37.75	-	38.25		56	4.30	1116	85.78
1	0.16	620	100.00	38.25	-	38.75		48	3.69	1164	89.47
				38.75	-	39.25		33	2.54	1197	92.01
				39.25	-	39.75		19	1.46	1216	93.47
				39.75	-	40.25		21	1.61	1237	95.08
				40.25	-	40.75		20	1.54	1257	96.62
				40.75	-	41.25		9	0.69	1266	97.31
				41.25	-	41.75		7	0.54	1273	97.85
				41.75	-	42.25		10	0.77	1283	98.62
				42.25	-	42.75		10	0.77	1293	99.39
				42.75	-	43.25		3	0.23	1296	99.62
				43.25	-	43.75		2	0.15	1298	99.77
				43.75	-	44.25		0	0.00	1298	99.77
				44.25	-	44.75		1	0.08	1299	99.85
				44.75	-	45.25		0	0.00	1299	99.85
				45.25	-	45.75		0	0.00	1299	99.85
				45.75	-	46.25		1	0.08	1300	99.92
				46.25	-	46.75		0	0.00	1300	99.92
				46.75	-	47.25		0	0.00	1300	99.92
				47.25	-	47.75		1	0.08	1301	100.00

(11) BICRISTAL BREADTH

The straight-line distance between the right and left iliac crest landmarks is measured with a beam caliper. The participant stands erect, looking straight ahead. The tissue is firmly compressed to ensure the measurement is made on the bony landmarks.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
21.62	8.51	1ST	23.30	9.17
22.40	8.82	2ND	23.60	9.29
22.70	8.94	3RD	23.80	9.37
23.10	9.09	5TH	24.21	9.53
23.90	9.41	10TH	24.80	9.76
24.30	9.57	15TH	25.23	9.93
24.80	9.76	20TH	25.50	10.04
25.10	9.88	25TH	25.80	10.16
25.40	10.00	30TH	26.10	10.28
25.60	10.08	35TH	26.30	10.35
25.90	10.20	40TH	26.50	10.43
26.20	10.31	45TH	26.80	10.55
26.40	10.39	50TH	27.00	10.63
26.60	10.47	55TH	27.30	10.75
26.80	10.55	60TH	27.50	10.83
27.17	10.70	65TH	27.80	10.94
27.40	10.79	70TH	28.00	11.02
27.70	10.91	75TH	28.20	11.10
27.90	10.98	80TH	28.50	11.22
28.30	11.14	85TH	28.87	11.37
28.80	11.34	90TH	29.30	11.54
29.40	11.57	95TH	30.00	11.81
29.90	11.77	97TH	30.40	11.97
30.46	11.99	98TH	31.00	12.20
31.00	12.20	99TH	31.60	12.44

(11) BICRISTAL BREADTH

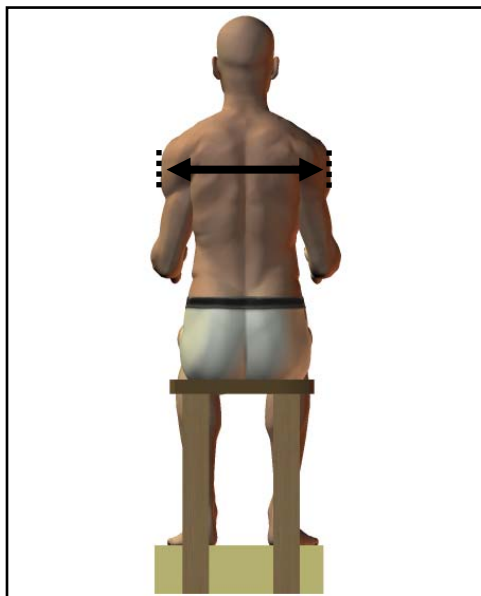
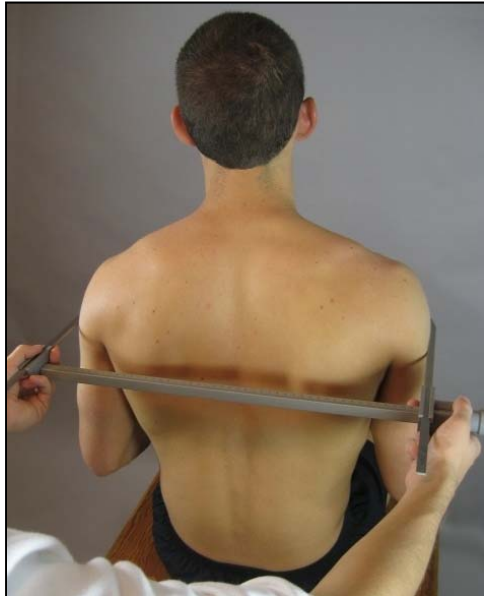
FEMALES		
CM		IN
26.36	MEAN	10.38
0.08	STD ERROR (MEAN)	0.03
1.93	STANDARD DEVIATION	0.76
0.05	STD ERROR (STD DEV)	0.02
20.30	MINIMUM	7.99
33.20	MAXIMUM	13.07
SKEWNESS		-0.02
KURTOSIS		3.26
COEFFICIENT OF VARIATION		7.3%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
27.05	MEAN	10.65
0.05	STD ERROR (MEAN)	0.02
1.76	STANDARD DEVIATION	0.69
0.03	STD ERROR (STD DEV)	0.01
20.70	MINIMUM	8.15
33.10	MAXIMUM	13.03
SKEWNESS		0.16
KURTOSIS		3.03
COEFFICIENT OF VARIATION		6.5%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
F	FPct	CumF	CumFPct	CM				F	FPct	CumF	CumFPct
1	0.16	1	0.16	20.10	-	20.35					
0	0.00	1	0.16	20.35	-	20.60					
2	0.32	3	0.48	20.60	-	20.85		1	0.08	1	0.08
0	0.00	3	0.48	20.85	-	21.10		0	0.00	1	0.08
1	0.16	4	0.65	21.10	-	21.35		0	0.00	1	0.08
1	0.16	5	0.81	21.35	-	21.60		0	0.00	1	0.08
2	0.32	7	1.13	21.60	-	21.85		0	0.00	1	0.08
2	0.32	9	1.45	21.85	-	22.10		1	0.08	2	0.15
1	0.16	10	1.61	22.10	-	22.35		0	0.00	2	0.15
5	0.81	15	2.42	22.35	-	22.60		0	0.00	2	0.15
6	0.97	21	3.39	22.60	-	22.85		3	0.23	5	0.38
8	1.29	29	4.68	22.85	-	23.10		4	0.31	9	0.69
11	1.77	40	6.45	23.10	-	23.35		7	0.54	16	1.23
10	1.61	50	8.06	23.35	-	23.60		8	0.61	24	1.84
9	1.45	59	9.52	23.60	-	23.85		19	1.46	43	3.31
7	1.13	66	10.65	23.85	-	24.10		6	0.46	49	3.77
29	4.68	95	15.32	24.10	-	24.35		24	1.84	73	5.61
8	1.29	103	16.61	24.35	-	24.60		24	1.84	97	7.46
30	4.84	133	21.45	24.60	-	24.85		38	2.92	135	10.38
16	2.58	149	24.03	24.85	-	25.10		24	1.84	159	12.22
36	5.81	185	29.84	25.10	-	25.35		71	5.46	230	17.68
28	4.52	213	34.35	25.35	-	25.60		49	3.77	279	21.45
29	4.68	242	39.03	25.60	-	25.85		58	4.46	337	25.90
17	2.74	259	41.77	25.85	-	26.10		42	3.23	379	29.13
36	5.81	295	47.58	26.10	-	26.35		83	6.38	462	35.51
39	6.29	334	53.87	26.35	-	26.60		62	4.77	524	40.28
41	6.61	375	60.48	26.60	-	26.85		89	6.84	613	47.12
16	2.58	391	63.06	26.85	-	27.10		48	3.69	661	50.81
39	6.29	430	69.35	27.10	-	27.35		86	6.61	747	57.42
21	3.39	451	72.74	27.35	-	27.60		54	4.15	801	61.57
33	5.32	484	78.06	27.60	-	27.85		65	5.00	866	66.56
17	2.74	501	80.81	27.85	-	28.10		53	4.07	919	70.64
28	4.52	529	85.32	28.10	-	28.35		82	6.30	1001	76.94
21	3.39	550	88.71	28.35	-	28.60		45	3.46	1046	80.40
16	2.58	566	91.29	28.60	-	28.85		60	4.61	1106	85.01
10	1.61	576	92.90	28.85	-	29.10		36	2.77	1142	87.78
12	1.94	588	94.84	29.10	-	29.35		36	2.77	1178	90.55
8	1.29	596	96.13	29.35	-	29.60		25	1.92	1203	92.47
4	0.65	600	96.77	29.60	-	29.85		24	1.84	1227	94.31
5	0.81	605	97.58	29.85	-	30.10		10	0.77	1237	95.08
2	0.32	607	97.90	30.10	-	30.35		23	1.77	1260	96.85
2	0.32	609	98.23	30.35	-	30.60		8	0.61	1268	97.46
3	0.48	612	98.71	30.60	-	30.85		6	0.46	1274	97.92
3	0.48	615	99.19	30.85	-	31.10		2	0.15	1276	98.08
1	0.16	616	99.35	31.10	-	31.35		9	0.69	1285	98.77
0	0.00	616	99.35	31.35	-	31.60		3	0.23	1288	99.00
1	0.16	617	99.52	31.60	-	31.85		6	0.46	1294	99.46
1	0.16	618	99.68	31.85	-	32.10		2	0.15	1296	99.62
0	0.00	618	99.68	32.10	-	32.35		2	0.15	1298	99.77
0	0.00	618	99.68	32.35	-	32.60		0	0.00	1298	99.77
1	0.16	619	99.84	32.60	-	32.85		0	0.00	1298	99.77
0	0.00	619	99.84	32.85	-	33.10		2	0.15	1300	99.92
1	0.16	620	100.00	33.10	-	33.35		1	0.08	1301	100.00

(12) BIDELOID BREADTH

The maximum horizontal distance between the lateral margins of the upper arms on the deltoid muscles is measured with a beam caliper. The participant sits erect, looking straight ahead. The shoulders and upper arms are relaxed, and the forearms and hands are extended forward horizontally with the palms facing each other. The measurement is made at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
39.90	15.71	1ST	43.70	17.20
40.14	15.81	2ND	44.30	17.44
40.50	15.94	3RD	44.70	17.60
40.61	15.98	5TH	45.40	17.87
41.30	16.26	10TH	46.20	18.19
41.90	16.50	15TH	46.90	18.46
42.30	16.65	20TH	47.40	18.66
42.60	16.77	25TH	48.00	18.90
43.00	16.93	30TH	48.30	19.02
43.20	17.01	35TH	48.70	19.17
43.60	17.17	40TH	49.10	19.33
43.90	17.28	45TH	49.40	19.45
44.10	17.36	50TH	49.80	19.61
44.40	17.48	55TH	50.01	19.69
44.70	17.60	60TH	50.50	19.88
45.00	17.72	65TH	50.80	20.00
45.27	17.82	70TH	51.20	20.16
45.60	17.95	75TH	51.60	20.31
46.00	18.11	80TH	52.06	20.49
46.50	18.31	85TH	52.60	20.71
47.00	18.50	90TH	53.40	21.02
48.20	18.98	95TH	54.40	21.42
48.50	19.09	97TH	55.09	21.69
49.06	19.31	98TH	55.80	21.97
49.86	19.63	99TH	56.80	22.36

(12) BIDELOID BREADTH

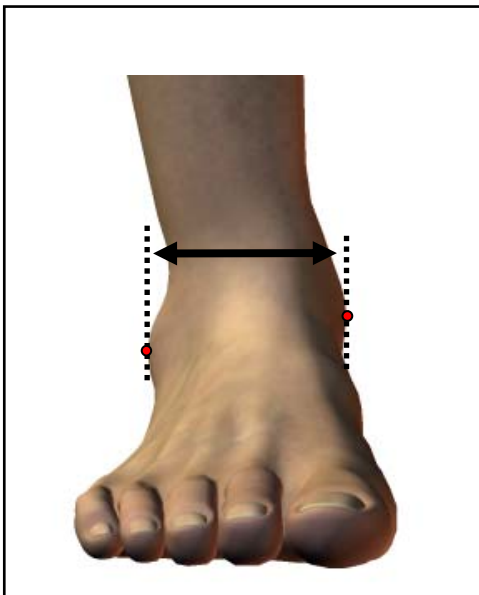
FEMALES		
CM		IN
44.19	MEAN	17.40
0.09	STD ERROR (MEAN)	0.03
2.22	STANDARD DEVIATION	0.87
0.06	STD ERROR (STD DEV)	0.02
37.50	MINIMUM	14.76
53.90	MAXIMUM	21.22
SKEWNESS		0.29
KURTOSIS		3.28
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
49.79	MEAN	19.60
0.08	STD ERROR (MEAN)	0.03
2.77	STANDARD DEVIATION	1.09
0.05	STD ERROR (STD DEV)	0.02
41.50	MINIMUM	16.34
60.70	MAXIMUM	23.90
SKEWNESS		0.20
KURTOSIS		3.16
COEFFICIENT OF VARIATION		5.6%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	37.25	-	37.75					
1	0.16	2	0.32	37.75	-	38.25					
0	0.00	2	0.32	38.25	-	38.75					
1	0.16	3	0.48	38.75	-	39.25					
1	0.16	4	0.65	39.25	-	39.75					
9	1.45	13	2.10	39.75	-	40.25					
21	3.39	34	5.48	40.25	-	40.75					
23	3.71	57	9.19	40.75	-	41.25					
28	4.52	85	13.71	41.25	-	41.75		1	0.08	1	0.08
29	4.68	114	18.39	41.75	-	42.25		1	0.08	2	0.15
55	8.87	169	27.26	42.25	-	42.75		0	0.00	2	0.15
49	7.90	218	35.16	42.75	-	43.25		2	0.15	4	0.31
51	8.23	269	43.39	43.25	-	43.75		9	0.69	13	1.00
52	8.39	321	51.77	43.75	-	44.25		11	0.85	24	1.84
56	9.03	377	60.81	44.25	-	44.75		16	1.23	40	3.07
57	9.19	434	70.00	44.75	-	45.25		21	1.61	61	4.69
43	6.94	477	76.94	45.25	-	45.75		27	2.08	88	6.76
36	5.81	513	82.74	45.75	-	46.25		44	3.38	132	10.15
31	5.00	544	87.74	46.25	-	46.75		52	4.00	184	14.14
24	3.87	568	91.61	46.75	-	47.25		57	4.38	241	18.52
13	2.10	581	93.71	47.25	-	47.75		60	4.61	301	23.14
13	2.10	594	95.81	47.75	-	48.25		79	6.07	380	29.21
10	1.61	604	97.42	48.25	-	48.75		79	6.07	459	35.28
5	0.81	609	98.23	48.75	-	49.25		97	7.46	556	42.74
5	0.81	614	99.03	49.25	-	49.75		87	6.69	643	49.42
5	0.81	619	99.84	49.75	-	50.25		114	8.76	757	58.19
0	0.00	619	99.84	50.25	-	50.75		86	6.61	843	64.80
0	0.00	619	99.84	50.75	-	51.25		83	6.38	926	71.18
0	0.00	619	99.84	51.25	-	51.75		73	5.61	999	76.79
0	0.00	619	99.84	51.75	-	52.25		66	5.07	1065	81.86
0	0.00	619	99.84	52.25	-	52.75		57	4.38	1122	86.24
0	0.00	619	99.84	52.75	-	53.25		41	3.15	1163	89.39
0	0.00	619	99.84	53.25	-	53.75		35	2.69	1198	92.08
1	0.16	620	100.00	53.75	-	54.25		30	2.31	1228	94.39
				54.25	-	54.75		24	1.84	1252	96.23
				54.75	-	55.25		16	1.23	1268	97.46
				55.25	-	55.75		5	0.38	1273	97.85
				55.75	-	56.25		8	0.61	1281	98.46
				56.25	-	56.75		6	0.46	1287	98.92
				56.75	-	57.25		5	0.38	1292	99.31
				57.25	-	57.75		4	0.31	1296	99.62
				57.75	-	58.25		1	0.08	1297	99.69
				58.25	-	58.75		1	0.08	1298	99.77
				58.75	-	59.25		1	0.08	1299	99.85
				59.25	-	59.75		0	0.00	1299	99.85
				59.75	-	60.25		1	0.08	1300	99.92
				60.25	-	60.75		1	0.08	1301	100.00

(13) BIMALLEOLAR BREADTH

The horizontal distance between the maximum protrusions of the ankle bones (lateral and medial malleoli) of the right foot is measured with a Holtain caliper. The participant stands with the weight equally distributed on both feet.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
5.80	2.28	1ST	6.50	2.56
5.90	2.32	2ND	6.60	2.60
5.90	2.32	3RD	6.60	2.60
6.00	2.36	5TH	6.70	2.64
6.10	2.40	10TH	6.90	2.72
6.20	2.44	15TH	7.00	2.76
6.20	2.44	20TH	7.00	2.76
6.30	2.48	25TH	7.05	2.78
6.40	2.52	30TH	7.10	2.80
6.40	2.52	35TH	7.20	2.83
6.50	2.56	40TH	7.20	2.83
6.50	2.56	45TH	7.30	2.87
6.50	2.56	50TH	7.30	2.87
6.60	2.60	55TH	7.40	2.91
6.60	2.60	60TH	7.40	2.91
6.60	2.60	65TH	7.50	2.95
6.70	2.64	70TH	7.50	2.95
6.70	2.64	75TH	7.60	2.99
6.80	2.68	80TH	7.70	3.03
6.90	2.72	85TH	7.70	3.03
7.00	2.76	90TH	7.80	3.07
7.09	2.80	95TH	8.00	3.15
7.10	2.80	97TH	8.10	3.19
7.30	2.87	98TH	8.20	3.23
7.40	2.91	99TH	8.30	3.27

(13) BIMALLEOLAR BREADTH

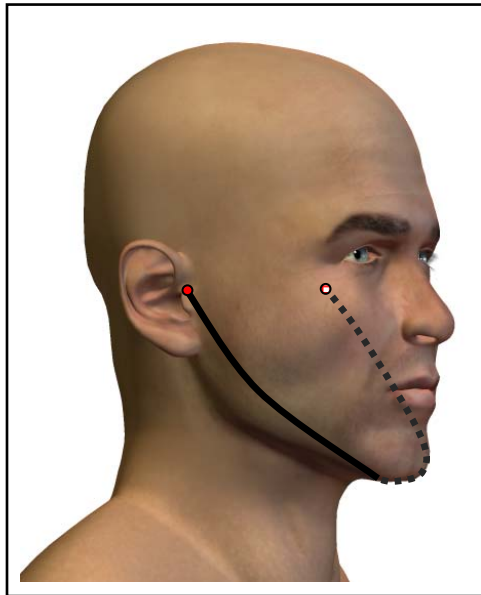
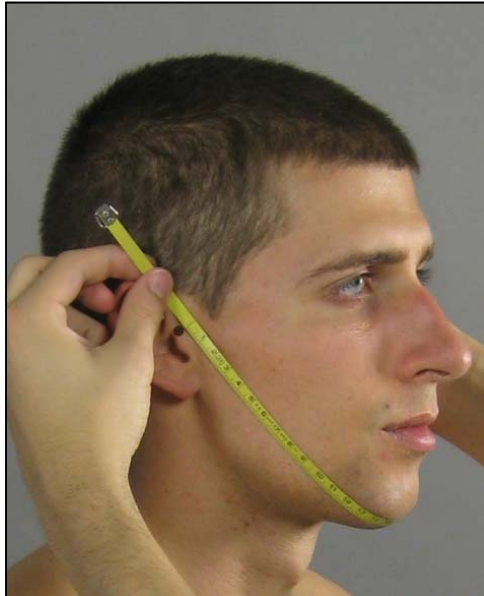
FEMALES		
<u>CM</u>		<u>IN</u>
6.53	MEAN	2.57
0.01	STD ERROR (MEAN)	0.01
0.33	STANDARD DEVIATION	0.13
0.01	STD ERROR (STD DEV)	0.00
5.50	MINIMUM	2.17
8.10	MAXIMUM	3.19
SKEWNESS		0.35
KURTOSIS		3.89
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
7.33	MEAN	2.89
0.01	STD ERROR (MEAN)	0.00
0.39	STANDARD DEVIATION	0.15
0.01	STD ERROR (STD DEV)	0.00
6.20	MINIMUM	2.44
8.70	MAXIMUM	3.43
SKEWNESS		0.13
KURTOSIS		3.02
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	5.45	-	5.55					
0	0.00	1	0.16	5.55	-	5.65					
2	0.32	3	0.48	5.65	-	5.75					
4	0.65	7	1.13	5.75	-	5.85					
13	2.10	20	3.23	5.85	-	5.95					
22	3.55	42	6.77	5.95	-	6.05					
28	4.52	70	11.29	6.05	-	6.15					
57	9.19	127	20.48	6.15	-	6.25		3	0.23	3	0.23
55	8.87	182	29.35	6.25	-	6.35		1	0.08	4	0.31
58	9.35	240	38.71	6.35	-	6.45		4	0.31	8	0.61
99	15.97	339	54.68	6.45	-	6.55		13	1.00	21	1.61
84	13.55	423	68.23	6.55	-	6.65		30	2.31	51	3.92
55	8.87	478	77.10	6.65	-	6.75		34	2.61	85	6.53
47	7.58	525	84.68	6.75	-	6.85		41	3.15	126	9.68
25	4.03	550	88.71	6.85	-	6.95		65	5.00	191	14.68
39	6.29	589	95.00	6.95	-	7.05		134	10.30	325	24.98
15	2.42	604	97.42	7.05	-	7.15		112	8.61	437	33.59
3	0.48	607	97.90	7.15	-	7.25		91	6.99	528	40.58
5	0.81	612	98.71	7.25	-	7.35		148	11.38	676	51.96
4	0.65	616	99.35	7.35	-	7.45		134	10.30	810	62.26
1	0.16	617	99.52	7.45	-	7.55		128	9.84	938	72.10
1	0.16	618	99.68	7.55	-	7.65		95	7.30	1033	79.40
1	0.16	619	99.84	7.65	-	7.75		84	6.46	1117	85.86
0	0.00	619	99.84	7.75	-	7.85		70	5.38	1187	91.24
0	0.00	619	99.84	7.85	-	7.95		37	2.84	1224	94.08
0	0.00	619	99.84	7.95	-	8.05		37	2.84	1261	96.93
1	0.16	620	100.00	8.05	-	8.15		11	0.85	1272	97.77
				8.15	-	8.25		11	0.85	1283	98.62
				8.25	-	8.35		10	0.77	1293	99.39
				8.35	-	8.45		3	0.23	1296	99.62
				8.45	-	8.55		3	0.23	1299	99.85
				8.55	-	8.65		1	0.08	1300	99.92
				8.65	-	8.75		1	0.08	1301	100.00

(14) BITRAGON CHIN ARC

The surface distance between the right and left tragon landmarks across the chin landmark is measured with a tape. The teeth are lightly occluded.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
28.02	11.03	1ST	30.00	11.81
28.30	11.14	2ND	30.20	11.89
28.40	11.18	3RD	30.41	11.97
28.50	11.22	5TH	30.71	12.09
29.00	11.42	10TH	31.20	12.28
29.30	11.54	15TH	31.50	12.40
29.50	11.61	20TH	31.70	12.48
29.80	11.73	25TH	32.00	12.60
30.00	11.81	30TH	32.20	12.68
30.10	11.85	35TH	32.40	12.76
30.30	11.93	40TH	32.60	12.83
30.50	12.01	45TH	32.80	12.91
30.60	12.05	50TH	33.00	12.99
30.80	12.13	55TH	33.10	13.03
31.00	12.20	60TH	33.30	13.11
31.10	12.24	65TH	33.50	13.19
31.37	12.35	70TH	33.70	13.27
31.50	12.40	75TH	33.90	13.35
31.80	12.52	80TH	34.00	13.39
32.00	12.60	85TH	34.30	13.50
32.40	12.76	90TH	34.70	13.66
32.80	12.91	95TH	35.30	13.90
33.34	13.12	97TH	35.60	14.02
33.46	13.17	98TH	35.70	14.06
33.98	13.38	99TH	36.20	14.25

(14) BITRAGON CHIN ARC

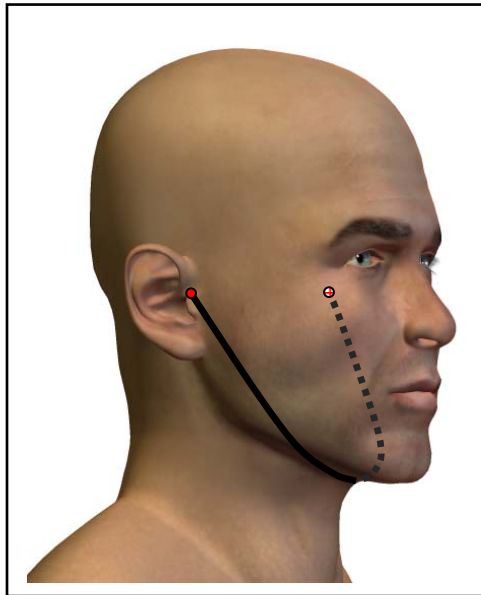
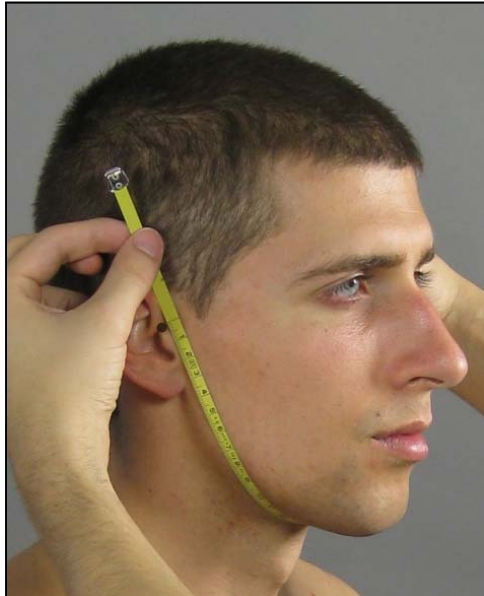
FEMALES		
CM		IN
30.67	MEAN	12.08
0.05	STD ERROR (MEAN)	0.02
1.28	STANDARD DEVIATION	0.50
0.04	STD ERROR (STD DEV)	0.01
27.70	MINIMUM	10.91
34.70	MAXIMUM	13.66
SKEWNESS		0.22
KURTOSIS		2.81
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
32.95	MEAN	12.97
0.04	STD ERROR (MEAN)	0.01
1.36	STANDARD DEVIATION	0.54
0.03	STD ERROR (STD DEV)	0.01
28.80	MINIMUM	11.34
37.00	MAXIMUM	14.57
SKEWNESS		0.08
KURTOSIS		2.75
COEFFICIENT OF VARIATION		4.1%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
F	FPct	CumF	CumFPct	CM				F	FPct	CumF	CumFPct
3	0.48	3	0.48	27.60	-	27.85					
3	0.48	6	0.97	27.85	-	28.10					
11	1.77	17	2.74	28.10	-	28.35					
15	2.42	32	5.16	28.35	-	28.60					
16	2.58	48	7.74	28.60	-	28.85		1	0.08	1	0.08
20	3.23	68	10.97	28.85	-	29.10		0	0.00	1	0.08
31	5.00	99	15.97	29.10	-	29.35		1	0.08	2	0.15
30	4.84	129	20.81	29.35	-	29.60		1	0.08	3	0.23
36	5.81	165	26.61	29.60	-	29.85		5	0.38	8	0.61
41	6.61	206	33.23	29.85	-	30.10		10	0.77	18	1.38
48	7.74	254	40.97	30.10	-	30.35		13	1.00	31	2.38
47	7.58	301	48.55	30.35	-	30.60		18	1.38	49	3.77
58	9.35	359	57.90	30.60	-	30.85		30	2.31	79	6.07
32	5.16	391	63.06	30.85	-	31.10		31	2.38	110	8.46
43	6.94	434	70.00	31.10	-	31.35		57	4.38	167	12.84
41	6.61	475	76.61	31.35	-	31.60		45	3.46	212	16.30
30	4.84	505	81.45	31.60	-	31.85		79	6.07	291	22.37
31	5.00	536	86.45	31.85	-	32.10		62	4.77	353	27.13
20	3.23	556	89.68	32.10	-	32.35		83	6.38	436	33.51
24	3.87	580	93.55	32.35	-	32.60		72	5.53	508	39.05
10	1.61	590	95.16	32.60	-	32.85		113	8.69	621	47.73
7	1.13	597	96.29	32.85	-	33.10		77	5.92	698	53.65
5	0.81	602	97.10	33.10	-	33.35		100	7.69	798	61.34
8	1.29	610	98.39	33.35	-	33.60		67	5.15	865	66.49
3	0.48	613	98.87	33.60	-	33.85		107	8.22	972	74.71
4	0.65	617	99.52	33.85	-	34.10		77	5.92	1049	80.63
2	0.32	619	99.84	34.10	-	34.35		59	4.53	1108	85.17
0	0.00	619	99.84	34.35	-	34.60		41	3.15	1149	88.32
1	0.16	620	100.00	34.60	-	34.85		35	2.69	1184	91.01
				34.85	-	35.10		25	1.92	1209	92.93
				35.10	-	35.35		32	2.46	1241	95.39
				35.35	-	35.60		19	1.46	1260	96.85
				35.60	-	35.85		22	1.69	1282	98.54
				35.85	-	36.10		5	0.38	1287	98.92
				36.10	-	36.35		6	0.46	1293	99.39
				36.35	-	36.60		2	0.15	1295	99.54
				36.60	-	36.85		4	0.31	1299	99.85
				36.85	-	37.10		2	0.15	1301	100.00

(15) BITRAGON SUBMANDIBULAR ARC

The surface distance between the right and left tragon landmarks across the submandibular landmark is measured with a tape. The head is in the Frankfurt plane, and the teeth are lightly occluded.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
25.02	9.85	1ST	27.70	10.91
25.40	10.00	2ND	28.00	11.02
25.50	10.04	3RD	28.30	11.14
25.80	10.16	5TH	28.50	11.22
26.40	10.39	10TH	29.00	11.42
26.60	10.47	15TH	29.40	11.57
26.80	10.55	20TH	29.60	11.65
27.00	10.63	25TH	29.90	11.77
27.23	10.72	30TH	30.00	11.81
27.40	10.79	35TH	30.30	11.93
27.50	10.83	40TH	30.50	12.01
27.70	10.91	45TH	30.70	12.09
27.80	10.94	50TH	30.80	12.13
28.00	11.02	55TH	31.00	12.20
28.10	11.06	60TH	31.30	12.32
28.30	11.14	65TH	31.50	12.40
28.50	11.22	70TH	31.60	12.44
28.80	11.34	75TH	31.90	12.56
29.00	11.42	80TH	32.10	12.64
29.20	11.50	85TH	32.50	12.80
29.50	11.61	90TH	32.90	12.95
29.80	11.73	95TH	33.40	13.15
30.20	11.89	97TH	33.80	13.31
30.50	12.01	98TH	34.00	13.39
30.80	12.13	99TH	34.50	13.58

(15) BITRAGON SUBMANDIBULAR ARC

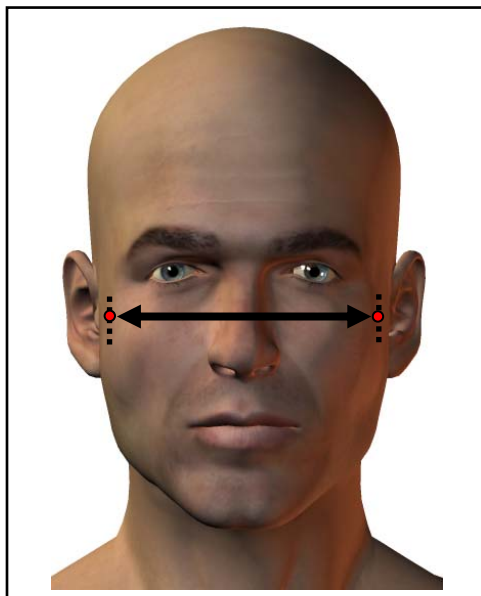
FEMALES		
CM		IN
27.88	MEAN	10.97
0.05	STD ERROR (MEAN)	0.02
1.24	STANDARD DEVIATION	0.49
0.04	STD ERROR (STD DEV)	0.01
24.50	MINIMUM	9.65
32.00	MAXIMUM	12.60
SKEWNESS		0.11
KURTOSIS		2.92
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
30.91	MEAN	12.17
0.04	STD ERROR (MEAN)	0.02
1.47	STANDARD DEVIATION	0.58
0.03	STD ERROR (STD DEV)	0.01
26.50	MINIMUM	10.43
35.60	MAXIMUM	14.02
SKEWNESS		0.15
KURTOSIS		2.88
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	24.25	-	24.75					
7	1.13	8	1.29	24.75	-	25.25					
20	3.23	28	4.52	25.25	-	25.75					
26	4.19	54	8.71	25.75	-	26.25					
57	9.19	111	17.90	26.25	-	26.75		2	0.15	2	0.15
75	12.10	186	30.00	26.75	-	27.25		2	0.15	4	0.31
110	17.74	296	47.74	27.25	-	27.75		10	0.77	14	1.08
93	15.00	389	62.74	27.75	-	28.25		22	1.69	36	2.77
66	10.65	455	73.39	28.25	-	28.75		49	3.77	85	6.53
77	12.42	532	85.81	28.75	-	29.25		70	5.38	155	11.91
54	8.71	586	94.52	29.25	-	29.75		130	9.99	285	21.91
17	2.74	603	97.26	29.75	-	30.25		152	11.68	437	33.59
10	1.61	613	98.87	30.25	-	30.75		176	13.53	613	47.12
4	0.65	617	99.52	30.75	-	31.25		163	12.53	776	59.65
1	0.16	618	99.68	31.25	-	31.75		160	12.30	936	71.94
2	0.32	620	100.00	31.75	-	32.25		121	9.30	1057	81.25
				32.25	-	32.75		95	7.30	1152	88.55
				32.75	-	33.25		76	5.84	1228	94.39
				33.25	-	33.75		33	2.54	1261	96.93
				33.75	-	34.25		21	1.61	1282	98.54
				34.25	-	34.75		13	1.00	1295	99.54
				34.75	-	35.25		3	0.23	1298	99.77
				35.25	-	35.75		3	0.23	1301	100.00

(16) BIZYGOMATIC BREADTH

The maximum horizontal breadth of the face (between the zygomatic arches) at the left and right zygion landmarks is measured with a spreading caliper.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
12.20	4.80	1ST	12.90	5.08
12.30	4.84	2ND	13.10	5.16
12.40	4.88	3RD	13.20	5.20
12.50	4.92	5TH	13.30	5.24
12.70	5.00	10TH	13.50	5.31
12.80	5.04	15TH	13.70	5.39
12.90	5.08	20TH	13.80	5.43
13.00	5.12	25TH	13.90	5.47
13.00	5.12	30TH	14.00	5.51
13.10	5.16	35TH	14.00	5.51
13.20	5.20	40TH	14.10	5.55
13.20	5.20	45TH	14.20	5.59
13.30	5.24	50TH	14.30	5.63
13.36	5.26	55TH	14.40	5.67
13.40	5.28	60TH	14.40	5.67
13.50	5.31	65TH	14.50	5.71
13.50	5.31	70TH	14.60	5.75
13.60	5.35	75TH	14.60	5.75
13.70	5.39	80TH	14.70	5.79
13.80	5.43	85TH	14.80	5.83
14.00	5.51	90TH	15.00	5.91
14.20	5.59	95TH	15.30	6.02
14.40	5.67	97TH	15.40	6.06
14.50	5.71	98TH	15.60	6.14
14.70	5.79	99TH	15.70	6.18

(16) BIZYGOMATIC BREADTH

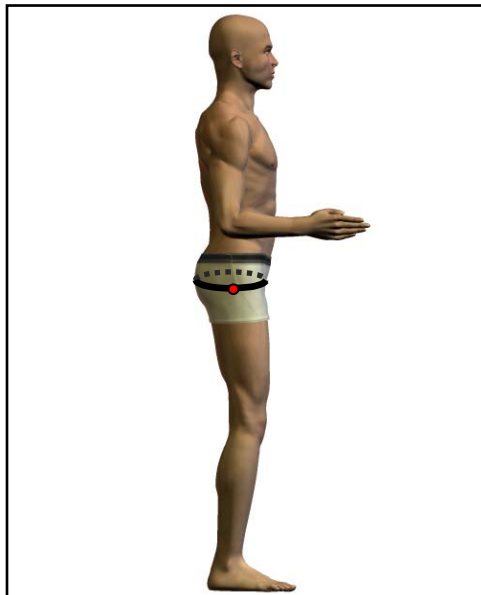
FEMALES		
CM		IN
13.31	MEAN	5.24
0.02	STD ERROR (MEAN)	0.01
0.52	STANDARD DEVIATION	0.20
0.01	STD ERROR (STD DEV)	0.01
12.00	MINIMUM	4.72
15.30	MAXIMUM	6.02
SKEWNESS		0.40
KURTOSIS		3.47
COEFFICIENT OF VARIATION		3.9%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
14.28	MEAN	5.62
0.02	STD ERROR (MEAN)	0.01
0.59	STANDARD DEVIATION	0.23
0.01	STD ERROR (STD DEV)	0.00
12.20	MINIMUM	4.80
16.30	MAXIMUM	6.42
SKEWNESS		0.08
KURTOSIS		3.17
COEFFICIENT OF VARIATION		4.1%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
2	0.32	2	0.32	11.95	-	12.05					
1	0.16	3	0.48	12.05	-	12.15					
5	0.81	8	1.29	12.15	-	12.25		1	0.08	1	0.08
8	1.29	16	2.58	12.25	-	12.35		0	0.00	1	0.08
9	1.45	25	4.03	12.35	-	12.45		0	0.00	1	0.08
15	2.42	40	6.45	12.45	-	12.55		1	0.08	2	0.15
17	2.74	57	9.19	12.55	-	12.65		1	0.08	3	0.23
21	3.39	78	12.58	12.65	-	12.75		1	0.08	4	0.31
34	5.48	112	18.06	12.75	-	12.85		5	0.38	9	0.69
30	4.84	142	22.90	12.85	-	12.95		8	0.62	17	1.31
52	8.39	194	31.29	12.95	-	13.05		6	0.46	23	1.77
44	7.10	238	38.39	13.05	-	13.15		7	0.54	30	2.31
50	8.06	288	46.45	13.15	-	13.25		16	1.23	46	3.54
53	8.55	341	55.00	13.25	-	13.35		22	1.69	68	5.23
60	9.68	401	64.68	13.35	-	13.45		35	2.69	103	7.92
48	7.74	449	72.42	13.45	-	13.55		49	3.77	152	11.69
35	5.65	484	78.06	13.55	-	13.65		41	3.15	193	14.85
30	4.84	514	82.90	13.65	-	13.75		40	3.08	233	17.92
20	3.23	534	86.13	13.75	-	13.85		68	5.23	301	23.15
9	1.45	543	87.58	13.85	-	13.95		62	4.77	363	27.92
23	3.71	566	91.29	13.95	-	14.05		96	7.38	459	35.31
13	2.10	579	93.39	14.05	-	14.15		69	5.31	528	40.62
13	2.10	592	95.48	14.15	-	14.25		88	6.77	616	47.38
6	0.97	598	96.45	14.25	-	14.35		98	7.54	714	54.92
8	1.29	606	97.74	14.35	-	14.45		106	8.15	820	63.08
4	0.65	610	98.39	14.45	-	14.55		75	5.77	895	68.85
3	0.48	613	98.87	14.55	-	14.65		81	6.23	976	75.08
3	0.48	616	99.35	14.65	-	14.75		70	5.38	1046	80.46
0	0.00	616	99.35	14.75	-	14.85		63	4.85	1109	85.31
2	0.32	618	99.68	14.85	-	14.95		37	2.85	1146	88.15
0	0.00	618	99.68	14.95	-	15.05		37	2.85	1183	91.00
1	0.16	619	99.84	15.05	-	15.15		23	1.77	1206	92.77
0	0.00	619	99.84	15.15	-	15.25		23	1.77	1229	94.54
1	0.16	620	100.00	15.25	-	15.35		25	1.92	1254	96.46
				15.35	-	15.45		9	0.69	1263	97.15
				15.45	-	15.55		10	0.77	1273	97.92
				15.55	-	15.65		9	0.69	1282	98.62
				15.65	-	15.75		7	0.54	1289	99.15
				15.75	-	15.85		4	0.31	1293	99.46
				15.85	-	15.95		1	0.08	1294	99.54
				15.95	-	16.05		4	0.31	1298	99.85
				16.05	-	16.15		1	0.08	1299	99.92
				16.15	-	16.25		0	0.00	1299	99.92
				16.25	-	16.35		1	0.08	1300	100.00

(17) BUTTOCK CIRCUMFERENCE

The horizontal circumference of the trunk at the level of the buttock point, posterior, right and left lateral landmarks, is measured with a tape. The participant stands erect with the heels together and the weight equally distributed on both feet.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
85.94	33.84	1ST	86.60	34.09
86.80	34.17	2ND	87.81	34.57
87.80	34.57	3RD	88.70	34.92
89.00	35.04	5TH	89.80	35.35
91.40	35.98	10TH	91.80	36.14
93.10	36.65	15TH	93.60	36.85
93.92	36.98	20TH	94.80	37.32
94.70	37.28	25TH	95.75	37.70
95.70	37.68	30TH	96.80	38.11
96.47	37.98	35TH	97.70	38.46
97.40	38.35	40TH	98.68	38.85
98.10	38.62	45TH	99.49	39.17
98.70	38.86	50TH	100.40	39.53
99.40	39.13	55TH	101.40	39.92
100.16	39.43	60TH	102.20	40.24
101.10	39.80	65TH	103.00	40.55
101.90	40.12	70TH	104.14	41.00
102.60	40.39	75TH	105.10	41.38
103.86	40.89	80TH	106.16	41.79
105.00	41.34	85TH	107.40	42.28
106.39	41.89	90TH	109.38	43.06
109.20	42.99	95TH	112.28	44.20
111.40	43.86	97TH	114.29	45.00
113.25	44.59	98TH	115.70	45.55
116.06	45.69	99TH	117.39	46.22

(17) BUTTOCK CIRCUMFERENCE

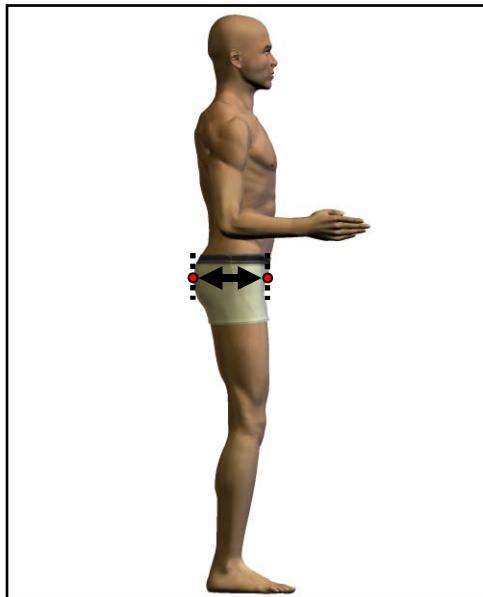
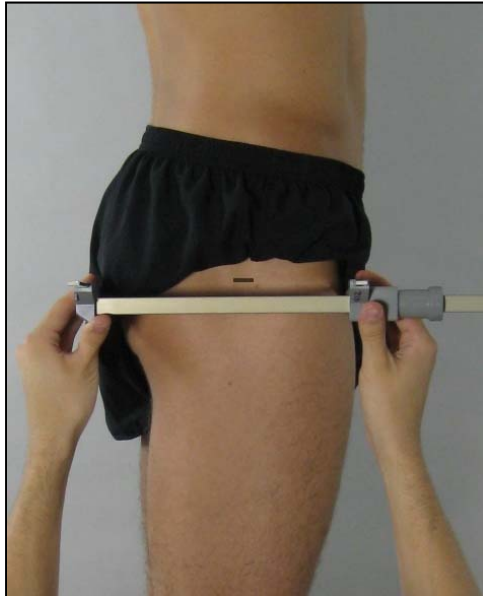
FEMALES		
CM		IN
99.02	MEAN	38.98
0.25	STD ERROR (MEAN)	0.10
6.20	STANDARD DEVIATION	2.44
0.18	STD ERROR (STD DEV)	0.07
81.90	MINIMUM	32.24
126.90	MAXIMUM	49.96
SKEWNESS		0.47
KURTOSIS		4.16
COEFFICIENT OF VARIATION		6.3%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
100.60	MEAN	39.61
0.19	STD ERROR (MEAN)	0.07
6.77	STANDARD DEVIATION	2.66
0.13	STD ERROR (STD DEV)	0.05
83.90	MINIMUM	33.03
125.30	MAXIMUM	49.33
SKEWNESS		0.26
KURTOSIS		2.98
COEFFICIENT OF VARIATION		6.7%
NUMBER OF PARTICIPANTS		1301

FREQUENCIES											
FEMALES				MALES							
E	FPct	CumF	CumFPct	CM		E	FPct	CumF	CumFPct		
1	0.16	1	0.16	81.55	-	82.55					
2	0.32	3	0.48	82.55	-	83.55					
1	0.16	4	0.65	83.55	-	84.55	5	0.38	5	0.38	
0	0.00	4	0.65	84.55	-	85.55	1	0.08	6	0.46	
6	0.97	10	1.61	85.55	-	86.55	6	0.46	12	0.92	
6	0.97	16	2.58	86.55	-	87.55	8	0.61	20	1.54	
9	1.45	25	4.03	87.55	-	88.55	18	1.38	38	2.92	
7	1.13	32	5.16	88.55	-	89.55	22	1.69	60	4.61	
11	1.77	43	6.94	89.55	-	90.55	24	1.84	84	6.46	
22	3.55	65	10.48	90.55	-	91.55	33	2.54	117	8.99	
18	2.90	83	13.39	91.55	-	92.55	41	3.15	158	12.14	
25	4.03	108	17.42	92.55	-	93.55	36	2.77	194	14.91	
43	6.94	151	24.35	93.55	-	94.55	50	3.84	244	18.75	
31	5.00	182	29.35	94.55	-	95.55	69	5.30	313	24.06	
35	5.65	217	35.00	95.55	-	96.55	62	4.77	375	28.82	
40	6.45	257	41.45	96.55	-	97.55	67	5.15	442	33.97	
45	7.26	302	48.71	97.55	-	98.55	65	5.00	507	38.97	
45	7.26	347	55.97	98.55	-	99.55	84	6.46	591	45.43	
35	5.65	382	61.61	99.55	-	100.55	67	5.15	658	50.58	
33	5.32	415	66.94	100.55	-	101.55	68	5.23	726	55.80	
47	7.58	462	74.52	101.55	-	102.55	88	6.76	814	62.57	
28	4.52	490	79.03	102.55	-	103.55	70	5.38	884	67.95	
23	3.71	513	82.74	103.55	-	104.55	56	4.30	940	72.25	
28	4.52	541	87.26	104.55	-	105.55	63	4.84	1003	77.09	
18	2.90	559	90.16	105.55	-	106.55	57	4.38	1060	81.48	
8	1.29	567	91.45	106.55	-	107.55	50	3.84	1110	85.32	
15	2.42	582	93.87	107.55	-	108.55	39	3.00	1149	88.32	
11	1.77	593	95.65	108.55	-	109.55	29	2.23	1178	90.55	
5	0.81	598	96.45	109.55	-	110.55	25	1.92	1203	92.47	
5	0.81	603	97.26	110.55	-	111.55	16	1.23	1219	93.70	
2	0.32	605	97.58	111.55	-	112.55	22	1.69	1241	95.39	
4	0.65	609	98.23	112.55	-	113.55	13	1.00	1254	96.39	
3	0.48	612	98.71	113.55	-	114.55	14	1.08	1268	97.46	
1	0.16	613	98.87	114.55	-	115.55	6	0.46	1274	97.92	
2	0.32	615	99.19	115.55	-	116.55	10	0.77	1284	98.69	
0	0.00	615	99.19	116.55	-	117.55	5	0.38	1289	99.08	
1	0.16	616	99.35	117.55	-	118.55	4	0.31	1293	99.39	
0	0.00	616	99.35	118.55	-	119.55	2	0.15	1295	99.54	
1	0.16	617	99.52	119.55	-	120.55	1	0.08	1296	99.62	
0	0.00	617	99.52	120.55	-	121.55	1	0.08	1297	99.69	
0	0.00	617	99.52	121.55	-	122.55	2	0.15	1299	99.85	
2	0.32	619	99.84	122.55	-	123.55	0	0.00	1299	99.85	
0	0.00	619	99.84	123.55	-	124.55	0	0.00	1299	99.85	
0	0.00	619	99.84	124.55	-	125.55	2	0.15	1301	100.00	
0	0.00	619	99.84	125.55	-	126.55					
1	0.16	620	100.00	126.55	-	127.55					

(18) BUTTOCK DEPTH

The horizontal depth of the torso at the level of the buttock point, posterior and right lateral landmarks, is measured using a beam caliper. The participant stands erect with the heels together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
17.82	7.02	1ST	19.00	7.48
18.20	7.17	2ND	19.40	7.64
18.50	7.28	3RD	19.80	7.80
18.81	7.40	5TH	20.20	7.95
19.60	7.72	10TH	20.92	8.24
20.10	7.91	15TH	21.50	8.46
20.30	7.99	20TH	21.90	8.62
20.60	8.11	25TH	22.30	8.78
20.90	8.23	30TH	22.50	8.86
21.10	8.31	35TH	22.90	9.02
21.30	8.39	40TH	23.10	9.09
21.60	8.50	45TH	23.40	9.21
21.80	8.58	50TH	23.70	9.33
22.10	8.70	55TH	24.00	9.45
22.36	8.80	60TH	24.20	9.53
22.57	8.89	65TH	24.43	9.62
22.90	9.02	70TH	24.80	9.76
23.20	9.13	75TH	25.10	9.88
23.60	9.29	80TH	25.50	10.04
23.99	9.44	85TH	26.00	10.24
24.50	9.65	90TH	26.50	10.43
25.40	10.00	95TH	27.50	10.83
26.14	10.29	97TH	28.00	11.02
26.52	10.44	98TH	28.50	11.22
28.34	11.15	99TH	29.20	11.50

(18) BUTTOCK DEPTH

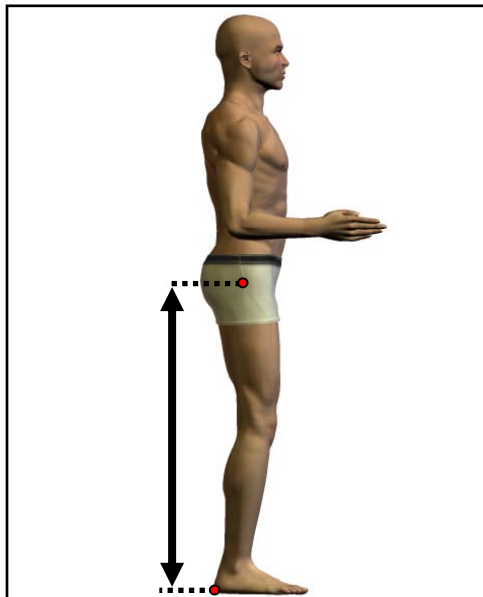
FEMALES		
CM		IN
21.98	MEAN	8.65
0.08	STD ERROR (MEAN)	0.03
2.02	STANDARD DEVIATION	0.80
0.06	STD ERROR (STD DEV)	0.02
16.80	MINIMUM	6.61
32.20	MAXIMUM	12.68
SKEWNESS		0.63
KURTOSIS		4.33
COEFFICIENT OF VARIATION		9.2%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
23.73	MEAN	9.34
0.06	STD ERROR (MEAN)	0.02
2.17	STANDARD DEVIATION	0.85
0.04	STD ERROR (STD DEV)	0.02
17.80	MINIMUM	7.01
32.40	MAXIMUM	12.76
SKEWNESS		0.25
KURTOSIS		3.18
COEFFICIENT OF VARIATION		9.1%
NUMBER OF PARTICIPANTS		1301

FEMALES						FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM		F	FPct	CumF	CumFPct				
2	0.32	2	0.32	16.75	-	17.25							
1	0.16	3	0.48	17.25	-	17.75							
10	1.61	13	2.10	17.75	-	18.25				2	0.15	2	0.15
13	2.10	26	4.19	18.25	-	18.75				6	0.46	8	0.61
19	3.06	45	7.26	18.75	-	19.25				10	0.77	18	1.38
24	3.87	69	11.13	19.25	-	19.75				17	1.31	35	2.69
46	7.42	115	18.55	19.75	-	20.25				31	2.38	66	5.07
54	8.71	169	27.26	20.25	-	20.75				45	3.46	111	8.53
69	11.13	238	38.39	20.75	-	21.25				46	3.54	157	12.07
63	10.16	301	48.55	21.25	-	21.75				81	6.23	238	18.29
58	9.35	359	57.90	21.75	-	22.25				81	6.23	319	24.52
64	10.32	423	68.23	22.25	-	22.75				110	8.46	429	32.97
51	8.23	474	76.45	22.75	-	23.25				131	10.07	560	43.04
31	5.00	505	81.45	23.25	-	23.75				113	8.69	673	51.73
36	5.81	541	87.26	23.75	-	24.25				124	9.53	797	61.26
28	4.52	569	91.77	24.25	-	24.75				105	8.07	902	69.33
18	2.90	587	94.68	24.75	-	25.25				99	7.61	1001	76.94
10	1.61	597	96.29	25.25	-	25.75				79	6.07	1080	83.01
6	0.97	603	97.26	25.75	-	26.25				68	5.23	1148	88.24
8	1.29	611	98.55	26.25	-	26.75				41	3.15	1189	91.39
0	0.00	611	98.55	26.75	-	27.25				37	2.84	1226	94.24
1	0.16	612	98.71	27.25	-	27.75				23	1.77	1249	96.00
2	0.32	614	99.03	27.75	-	28.25				18	1.38	1267	97.39
3	0.48	617	99.52	28.25	-	28.75				14	1.08	1281	98.46
1	0.16	618	99.68	28.75	-	29.25				9	0.69	1290	99.15
1	0.16	619	99.84	29.25	-	29.75				4	0.31	1294	99.46
0	0.00	619	99.84	29.75	-	30.25				3	0.23	1297	99.69
0	0.00	619	99.84	30.25	-	30.75				1	0.08	1298	99.77
0	0.00	619	99.84	30.75	-	31.25				1	0.08	1299	99.85
0	0.00	619	99.84	31.25	-	31.75				0	0.00	1299	99.85
0	0.00	619	99.84	31.75	-	32.25				1	0.08	1300	99.92
1	0.16	620	100.00	32.25	-	32.75				1	0.08	1301	100.00

(19) BUTTOCK HEIGHT

The vertical distance between a standing surface and the level of the buttock point, right lateral landmark, is measured with an anthropometer at the right side of the thigh. The participant stands erect with the heels together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
74.90	29.49	1ST	78.80	31.02
75.74	29.82	2ND	79.70	31.38
76.30	30.04	3RD	80.40	31.65
77.01	30.31	5TH	81.31	32.01
78.50	30.91	10TH	83.00	32.68
79.30	31.22	15TH	84.00	33.07
80.20	31.57	20TH	84.80	33.39
80.90	31.85	25TH	85.50	33.66
81.30	32.01	30TH	86.20	33.94
82.10	32.32	35TH	86.90	34.21
82.60	32.52	40TH	87.50	34.45
83.20	32.76	45TH	88.10	34.69
83.80	32.99	50TH	88.60	34.88
84.40	33.23	55TH	89.20	35.12
84.90	33.43	60TH	89.80	35.35
85.50	33.66	65TH	90.40	35.59
86.07	33.89	70TH	91.00	35.83
86.70	34.13	75TH	91.80	36.14
87.30	34.37	80TH	92.70	36.50
88.10	34.69	85TH	93.70	36.89
89.10	35.08	90TH	95.10	37.44
90.80	35.75	95TH	97.19	38.27
92.04	36.23	97TH	98.40	38.74
92.99	36.61	98TH	99.30	39.09
95.20	37.48	99TH	101.29	39.88

(19) BUTTOCK HEIGHT

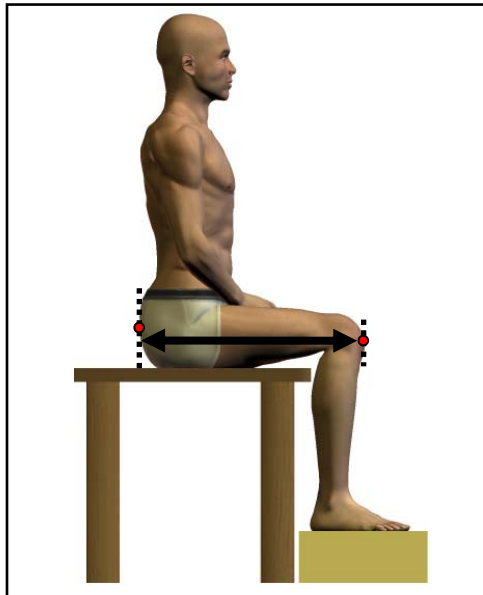
FEMALES		
CM		IN
83.83	MEAN	33.00
0.17	STD ERROR (MEAN)	0.07
4.21	STANDARD DEVIATION	1.66
0.12	STD ERROR (STD DEV)	0.05
73.30	MINIMUM	28.86
99.60	MAXIMUM	39.21
SKEWNESS		0.25
KURTOSIS		3.16
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
88.81	MEAN	34.97
0.13	STD ERROR (MEAN)	0.05
4.71	STANDARD DEVIATION	1.85
0.09	STD ERROR (STD DEV)	0.04
74.60	MINIMUM	29.37
106.70	MAXIMUM	42.01
SKEWNESS		0.25
KURTOSIS		0.09
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
2	0.32	2	0.32	72.55	-	73.55					
2	0.32	4	0.65	73.55	-	74.55					
5	0.81	9	1.45	74.55	-	75.55		1	0.08	1	0.08
12	1.94	21	3.39	75.55	-	76.55		2	0.15	3	0.23
20	3.23	41	6.61	76.55	-	77.55		3	0.23	6	0.46
22	3.55	63	10.16	77.55	-	78.55		4	0.31	10	0.77
40	6.45	103	16.61	78.55	-	79.55		14	1.08	24	1.84
37	5.97	140	22.58	79.55	-	80.55		21	1.61	45	3.46
54	8.71	194	31.29	80.55	-	81.55		27	2.08	72	5.53
48	7.74	242	39.03	81.55	-	82.55		39	3.00	111	8.53
57	9.19	299	48.23	82.55	-	83.55		54	4.15	165	12.68
51	8.23	350	56.45	83.55	-	84.55		73	5.61	238	18.29
54	8.71	404	65.16	84.55	-	85.55		89	6.84	327	25.13
55	8.87	459	74.03	85.55	-	86.55		98	7.53	425	32.67
52	8.39	511	82.42	86.55	-	87.55		103	7.92	528	40.58
25	4.03	536	86.45	87.55	-	88.55		107	8.22	635	48.81
37	5.97	573	92.42	88.55	-	89.55		114	8.76	749	57.57
14	2.26	587	94.68	89.55	-	90.55		117	8.99	866	66.56
10	1.61	597	96.29	90.55	-	91.55		92	7.07	958	73.64
8	1.29	605	97.58	91.55	-	92.55		74	5.69	1032	79.32
6	0.97	611	98.55	92.55	-	93.55		64	4.92	1096	84.24
2	0.32	613	98.87	93.55	-	94.55		57	4.38	1153	88.62
4	0.65	617	99.52	94.55	-	95.55		48	3.69	1201	92.31
0	0.00	617	99.52	95.55	-	96.55		22	1.69	1223	94.00
1	0.16	618	99.68	96.55	-	97.55		27	2.08	1250	96.08
1	0.16	619	99.84	97.55	-	98.55		15	1.15	1265	97.23
0	0.00	619	99.84	98.55	-	99.55		12	0.92	1277	98.16
1	0.16	620	100.00	99.55	-	100.55		10	0.77	1287	98.92
				100.55	-	101.55		4	0.31	1291	99.23
				101.55	-	102.55		8	0.61	1299	99.85
				102.55	-	103.55		1	0.08	1300	99.92
				103.55	-	104.55		0	0.00	1300	99.92
				104.55	-	105.55		0	0.00	1300	99.92
				105.55	-	106.55		0	0.00	1300	99.92
				106.55	-	107.55		1	0.08	1301	100.00

(20) BUTTOCK-KNEE LENGTH

The horizontal distance between a buttock plate placed at the most posterior point on either buttock and the knee point, anterior landmark, is measured with an anthropometer. The participant sits erect. The thighs are parallel and the knees flexed 90° with the feet in line with the thighs.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
51.92	20.44	1ST	54.90	21.61
52.54	20.69	2ND	55.40	21.81
53.10	20.91	3RD	55.71	21.93
53.80	21.18	5TH	56.51	22.24
54.60	21.50	10TH	57.30	22.56
55.30	21.77	15TH	58.10	22.87
55.80	21.97	20TH	58.60	23.07
56.20	22.13	25TH	59.20	23.31
56.70	22.32	30TH	59.70	23.50
57.00	22.44	35TH	60.10	23.66
57.40	22.60	40TH	60.50	23.82
57.65	22.70	45TH	60.80	23.94
58.00	22.83	50TH	61.30	24.13
58.30	22.95	55TH	61.60	24.25
58.70	23.11	60TH	62.00	24.41
59.20	23.31	65TH	62.40	24.57
59.60	23.46	70TH	62.80	24.72
60.18	23.69	75TH	63.30	24.92
60.70	23.90	80TH	63.70	25.08
61.30	24.13	85TH	64.40	25.35
62.10	24.45	90TH	65.30	25.71
63.20	24.88	95TH	66.79	26.30
63.94	25.17	97TH	67.60	26.61
64.87	25.54	98TH	68.20	26.85
66.59	26.22	99TH	68.90	27.13

(20) BUTTOCK-KNEE LENGTH

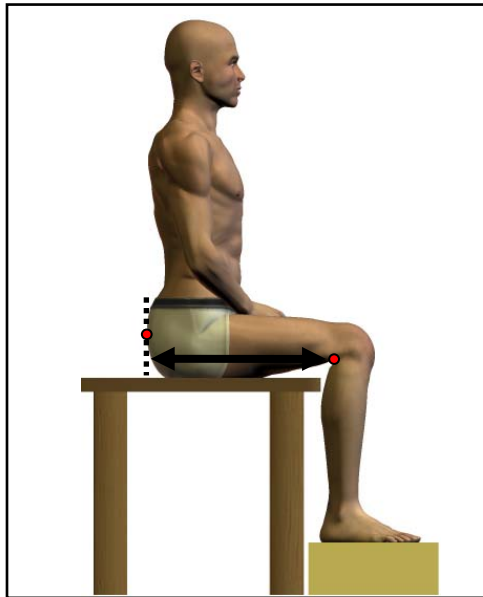
FEMALES		
CM		IN
58.25	MEAN	22.93
0.12	STD ERROR (MEAN)	0.05
2.96	STANDARD DEVIATION	1.16
0.08	STD ERROR (STD DEV)	0.03
49.00	MINIMUM	19.29
71.00	MAXIMUM	27.95
SKEWNESS		0.40
KURTOSIS		3.70
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
61.32	MEAN	24.14
0.09	STD ERROR (MEAN)	0.03
3.07	STANDARD DEVIATION	1.21
0.06	STD ERROR (STD DEV)	0.02
52.30	MINIMUM	20.59
71.90	MAXIMUM	28.31
SKEWNESS		0.22
KURTOSIS		2.99
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	48.75	-	49.25					
0	0.00	1	0.16	49.25	-	49.75					
1	0.16	2	0.32	49.75	-	50.25					
0	0.00	2	0.32	50.25	-	50.75					
0	0.00	2	0.32	50.75	-	51.25					
0	0.00	2	0.32	51.25	-	51.75					
6	0.97	8	1.29	51.75	-	52.25					
6	0.97	14	2.26	52.25	-	52.75		2	0.15	2	0.15
7	1.13	21	3.39	52.75	-	53.25		0	0.00	2	0.15
8	1.29	29	4.68	53.25	-	53.75		1	0.08	3	0.23
19	3.06	48	7.74	53.75	-	54.25		2	0.15	5	0.38
21	3.39	69	11.13	54.25	-	54.75		3	0.23	8	0.61
20	3.23	89	14.35	54.75	-	55.25		13	1.00	21	1.61
32	5.16	121	19.52	55.25	-	55.75		18	1.38	39	3.00
36	5.81	157	25.32	55.75	-	56.25		14	1.08	53	4.07
30	4.84	187	30.16	56.25	-	56.75		29	2.23	82	6.30
50	8.06	237	38.23	56.75	-	57.25		43	3.31	125	9.61
48	7.74	285	45.97	57.25	-	57.75		42	3.23	167	12.84
45	7.26	330	53.23	57.75	-	58.25		42	3.23	209	16.06
45	7.26	375	60.48	58.25	-	58.75		62	4.77	271	20.83
33	5.32	408	65.81	58.75	-	59.25		60	4.61	331	25.44
38	6.13	446	71.94	59.25	-	59.75		61	4.69	392	30.13
23	3.71	469	75.65	59.75	-	60.25		96	7.38	488	37.51
29	4.68	498	80.32	60.25	-	60.75		81	6.23	569	43.74
28	4.52	526	84.84	60.75	-	61.25		76	5.84	645	49.58
18	2.90	544	87.74	61.25	-	61.75		90	6.92	735	56.50
21	3.39	565	91.13	61.75	-	62.25		86	6.61	821	63.11
12	1.94	577	93.06	62.25	-	62.75		78	6.00	899	69.10
14	2.26	591	95.32	62.75	-	63.25		72	5.53	971	74.63
9	1.45	600	96.77	63.25	-	63.75		76	5.84	1047	80.48
5	0.81	605	97.58	63.75	-	64.25		48	3.69	1095	84.17
3	0.48	608	98.06	64.25	-	64.75		32	2.46	1127	86.63
2	0.32	610	98.39	64.75	-	65.25		40	3.07	1167	89.70
3	0.48	613	98.87	65.25	-	65.75		28	2.15	1195	91.85
1	0.16	614	99.03	65.75	-	66.25		22	1.69	1217	93.54
0	0.00	614	99.03	66.25	-	66.75		19	1.46	1236	95.00
1	0.16	615	99.19	66.75	-	67.25		18	1.38	1254	96.39
2	0.32	617	99.52	67.25	-	67.75		14	1.08	1268	97.46
1	0.16	618	99.68	67.75	-	68.25		9	0.69	1277	98.16
0	0.00	618	99.68	68.25	-	68.75		11	0.85	1288	99.00
1	0.16	619	99.84	68.75	-	69.25		3	0.23	1291	99.23
0	0.00	619	99.84	69.25	-	69.75		4	0.31	1295	99.54
0	0.00	619	99.84	69.75	-	70.25		1	0.08	1296	99.62
0	0.00	619	99.84	70.25	-	70.75		2	0.15	1298	99.77
1	0.16	620	100.00	70.75	-	71.25		2	0.15	1300	99.92
				71.25	-	71.75		0	0.00	1300	99.92
				71.75	-	72.25		1	0.08	1301	100.00

(21) BUTTOCK-POPLITEAL LENGTH

The horizontal distance between a buttock plate placed at the most posterior point on either buttock and the back of the right knee (the popliteal fossa at the dorsal juncture of the calf and thigh) is measured with an anthropometer. The participant sits erect. The thighs are parallel and the knees flexed 90° with the feet in line with the thighs.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
41.62	16.39	1ST	43.70	17.20
42.24	16.63	2ND	44.20	17.40
42.60	16.77	3RD	44.50	17.52
43.21	17.01	5TH	45.10	17.76
44.01	17.32	10TH	46.00	18.11
44.70	17.60	15TH	46.60	18.35
45.30	17.83	20TH	47.10	18.54
45.50	17.91	25TH	47.60	18.74
45.90	18.07	30TH	48.00	18.90
46.20	18.19	35TH	48.40	19.06
46.50	18.31	40TH	48.80	19.21
46.80	18.43	45TH	49.10	19.33
47.15	18.56	50TH	49.50	19.49
47.30	18.62	55TH	49.71	19.57
47.76	18.80	60TH	50.10	19.72
48.00	18.90	65TH	50.40	19.84
48.40	19.06	70TH	50.80	20.00
48.80	19.21	75TH	51.10	20.12
49.38	19.44	80TH	51.60	20.31
49.90	19.65	85TH	52.20	20.55
50.69	19.96	90TH	53.00	20.87
51.60	20.31	95TH	54.30	21.38
52.37	20.62	97TH	54.99	21.65
52.87	20.82	98TH	55.40	21.81
53.98	21.25	99TH	56.20	22.13

(21) BUTTOCK-POPLITEAL LENGTH

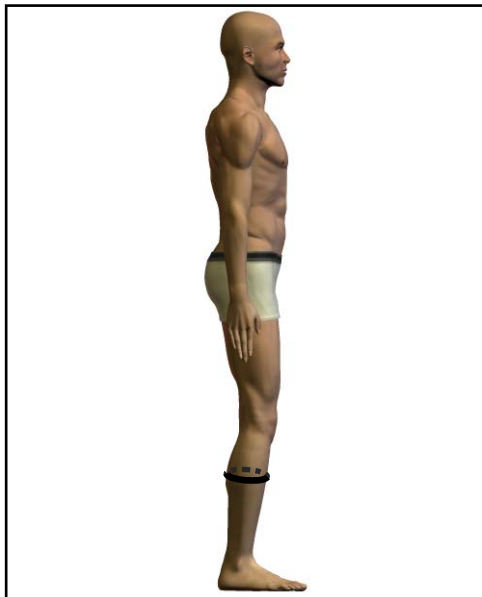
FEMALES		
CM		IN
47.24	MEAN	18.60
0.10	STD ERROR (MEAN)	0.04
2.55	STANDARD DEVIATION	1.00
0.07	STD ERROR (STD DEV)	0.03
38.30	MINIMUM	15.08
55.90	MAXIMUM	22.01
SKEWNESS		0.22
KURTOSIS		3.28
COEFFICIENT OF VARIATION		5.4%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
49.45	MEAN	19.47
0.07	STD ERROR (MEAN)	0.03
2.70	STANDARD DEVIATION	1.06
0.05	STD ERROR (STD DEV)	0.02
41.50	MINIMUM	16.34
59.30	MAXIMUM	23.35
SKEWNESS		0.21
KURTOSIS		3.03
COEFFICIENT OF VARIATION		5.5%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	38.25	-	38.75					
0	0.00	1	0.16	38.75	-	39.25					
0	0.00	1	0.16	39.25	-	39.75					
1	0.16	2	0.32	39.75	-	40.25					
0	0.00	2	0.32	40.25	-	40.75					
2	0.32	4	0.65	40.75	-	41.25					
4	0.65	8	1.29	41.25	-	41.75		1	0.08	1	0.08
4	0.65	12	1.94	41.75	-	42.25		0	0.00	1	0.08
8	1.29	20	3.23	42.25	-	42.75		4	0.31	5	0.38
11	1.77	31	5.00	42.75	-	43.25		2	0.15	7	0.54
16	2.58	47	7.58	43.25	-	43.75		7	0.54	14	1.08
22	3.55	69	11.13	43.75	-	44.25		13	1.00	27	2.08
25	4.03	94	15.16	44.25	-	44.75		18	1.38	45	3.46
27	4.35	121	19.52	44.75	-	45.25		26	2.00	71	5.46
55	8.87	176	28.39	45.25	-	45.75		37	2.84	108	8.30
46	7.42	222	35.81	45.75	-	46.25		47	3.61	155	11.91
46	7.42	268	43.23	46.25	-	46.75		59	4.53	214	16.45
57	9.19	325	52.42	46.75	-	47.25		63	4.84	277	21.29
47	7.58	372	60.00	47.25	-	47.75		69	5.30	346	26.59
50	8.06	422	68.06	47.75	-	48.25		75	5.76	421	32.36
42	6.77	464	74.84	48.25	-	48.75		98	7.53	519	39.89
30	4.84	494	79.68	48.75	-	49.25		95	7.30	614	47.19
26	4.19	520	83.87	49.25	-	49.75		102	7.84	716	55.03
23	3.71	543	87.58	49.75	-	50.25		111	8.53	827	63.57
20	3.23	563	90.81	50.25	-	50.75		82	6.30	909	69.87
15	2.42	578	93.23	50.75	-	51.25		88	6.76	997	76.63
15	2.42	593	95.65	51.25	-	51.75		69	5.30	1066	81.94
8	1.29	601	96.94	51.75	-	52.25		46	3.54	1112	85.47
7	1.13	608	98.06	52.25	-	52.75		43	3.31	1155	88.78
2	0.32	610	98.39	52.75	-	53.25		41	3.15	1196	91.93
3	0.48	613	98.87	53.25	-	53.75		22	1.69	1218	93.62
4	0.65	617	99.52	53.75	-	54.25		15	1.15	1233	94.77
1	0.16	618	99.68	54.25	-	54.75		16	1.23	1249	96.00
0	0.00	618	99.68	54.75	-	55.25		20	1.54	1269	97.54
1	0.16	619	99.84	55.25	-	55.75		15	1.15	1284	98.69
1	0.16	620	100.00	55.75	-	56.25		7	0.54	1291	99.23
				56.25	-	56.75		3	0.23	1294	99.46
				56.75	-	57.25		2	0.15	1296	99.62
				57.25	-	57.75		4	0.31	1300	99.92
				57.75	-	58.25		0	0.00	1300	99.92
				58.25	-	58.75		0	0.00	1300	99.92
				58.75	-	59.25		0	0.00	1300	99.92
				59.25	-	59.75		1	0.08	1301	100.00

(22) CALF CIRCUMFERENCE

The maximum horizontal circumference of the right calf is measured with a tape. The participant stands erect with the heels approximately 10 cm apart and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
31.02	12.21	1ST	32.30	12.72
31.48	12.39	2ND	33.00	12.99
31.86	12.55	3RD	33.60	13.23
32.70	12.87	5TH	34.20	13.46
33.30	13.11	10TH	35.10	13.82
33.90	13.35	15TH	35.70	14.06
34.40	13.54	20TH	36.20	14.25
34.70	13.66	25TH	36.50	14.37
35.00	13.78	30TH	37.00	14.57
35.30	13.90	35TH	37.30	14.69
35.60	14.02	40TH	37.70	14.84
35.90	14.13	45TH	38.00	14.96
36.20	14.25	50TH	38.40	15.12
36.50	14.37	55TH	38.80	15.28
36.80	14.49	60TH	39.20	15.43
37.10	14.61	65TH	39.50	15.55
37.50	14.76	70TH	39.80	15.67
37.80	14.88	75TH	40.20	15.83
38.30	15.08	80TH	40.50	15.94
38.80	15.28	85TH	41.00	16.14
39.30	15.47	90TH	41.70	16.42
40.50	15.94	95TH	42.90	16.89
41.24	16.23	97TH	43.60	17.17
41.66	16.40	98TH	44.10	17.36
42.30	16.65	99TH	44.80	17.64

(22) CALF CIRCUMFERENCE

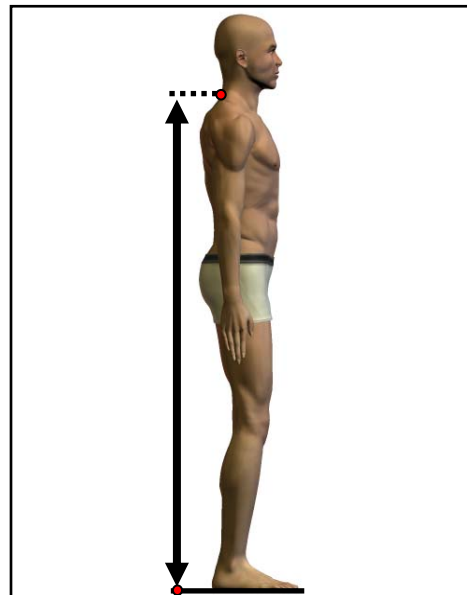
FEMALES		
CM		IN
36.31	MEAN	14.30
0.10	STD ERROR (MEAN)	0.04
2.43	STANDARD DEVIATION	0.95
0.07	STD ERROR (STD DEV)	0.03
29.10	MINIMUM	11.46
47.50	MAXIMUM	18.70
SKEWNESS		0.41
KURTOSIS		3.97
COEFFICIENT OF VARIATION		6.7%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
38.41	MEAN	15.12
0.07	STD ERROR (MEAN)	0.03
2.64	STANDARD DEVIATION	1.04
0.05	STD ERROR (STD DEV)	0.02
30.70	MINIMUM	12.09
47.50	MAXIMUM	18.70
SKEWNESS		0.08
KURTOSIS		2.99
COEFFICIENT OF VARIATION		6.9%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	28.75	-	29.25					
0	0.00	1	0.16	29.25	-	29.75					
0	0.00	1	0.16	29.75	-	30.25					
4	0.65	5	0.81	30.25	-	30.75		1	0.08	1	0.08
5	0.81	10	1.61	30.75	-	31.25		2	0.15	3	0.23
6	0.97	16	2.58	31.25	-	31.75		6	0.46	9	0.69
7	1.13	23	3.71	31.75	-	32.25		3	0.23	12	0.92
13	2.10	36	5.81	32.25	-	32.75		11	0.85	23	1.77
20	3.23	56	9.03	32.75	-	33.25		6	0.46	29	2.23
26	4.19	82	13.23	33.25	-	33.75		17	1.31	46	3.54
33	5.32	115	18.55	33.75	-	34.25		22	1.69	68	5.23
47	7.58	162	26.13	34.25	-	34.75		34	2.62	102	7.85
51	8.23	213	34.35	34.75	-	35.25		43	3.31	145	11.15
52	8.39	265	42.74	35.25	-	35.75		55	4.23	200	15.38
53	8.55	318	51.29	35.75	-	36.25		73	5.62	273	21.00
51	8.23	369	59.52	36.25	-	36.75		88	6.77	361	27.77
46	7.42	415	66.94	36.75	-	37.25		80	6.15	441	33.92
44	7.10	459	74.03	37.25	-	37.75		96	7.38	537	41.31
36	5.81	495	79.84	37.75	-	38.25		77	5.92	614	47.23
30	4.84	525	84.68	38.25	-	38.75		88	6.77	702	54.00
31	5.00	556	89.68	38.75	-	39.25		92	7.08	794	61.08
24	3.87	580	93.55	39.25	-	39.75		113	8.69	907	69.77
5	0.81	585	94.35	39.75	-	40.25		80	6.15	987	75.92
7	1.13	592	95.48	40.25	-	40.75		85	6.54	1072	82.46
10	1.61	602	97.10	40.75	-	41.25		62	4.77	1134	87.23
7	1.13	609	98.23	41.25	-	41.75		37	2.85	1171	90.08
4	0.65	613	98.87	41.75	-	42.25		31	2.38	1202	92.46
3	0.48	616	99.35	42.25	-	42.75		21	1.62	1223	94.08
1	0.16	617	99.52	42.75	-	43.25		27	2.08	1250	96.15
0	0.00	617	99.52	43.25	-	43.75		14	1.08	1264	97.23
1	0.16	618	99.68	43.75	-	44.25		12	0.92	1276	98.15
0	0.00	618	99.68	44.25	-	44.75		10	0.77	1286	98.92
0	0.00	618	99.68	44.75	-	45.25		5	0.38	1291	99.31
0	0.00	618	99.68	45.25	-	45.75		7	0.54	1298	99.85
0	0.00	618	99.68	45.75	-	46.25		0	0.00	1298	99.85
0	0.00	618	99.68	46.25	-	46.75		1	0.08	1299	99.92
1	0.16	619	99.84	46.75	-	47.25		0	0.00	1299	99.92
1	0.16	620	100.00	47.25	-	47.75		1	0.08	1300	100.00

(23) CERVICALE HEIGHT*

The vertical distance between a standing surface and the cervicale landmark is measured with an anthropometer. The participant stands erect with the head in the Frankfurt plane. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration



(23)CERVICALE HEIGHT

PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
126.76	49.91	1ST	137.61	54.17
128.18	50.46	2ND	138.90	54.69
128.56	50.62	3RD	139.81	55.04
130.00	51.18	5TH	141.00	55.51
131.81	51.89	10TH	143.00	56.30
133.12	52.41	15TH	144.40	56.85
133.90	52.72	20TH	145.70	57.36
135.00	53.15	25TH	146.90	57.83
135.93	53.51	30TH	147.70	58.15
136.90	53.90	35TH	148.50	58.46
137.74	54.23	40TH	149.28	58.77
138.50	54.53	45TH	150.09	59.09
139.15	54.78	50TH	150.90	59.41
139.66	54.98	55TH	151.50	59.65
140.40	55.28	60TH	152.40	60.00
141.17	55.58	65TH	153.20	60.31
142.10	55.94	70TH	154.10	60.67
142.90	56.26	75TH	155.00	61.02
143.90	56.65	80TH	156.50	61.61
144.90	57.05	85TH	157.90	62.17
146.50	57.68	90TH	159.50	62.80
149.00	58.66	95TH	162.20	63.86
150.07	59.09	97TH	163.80	64.49
151.72	59.73	98TH	164.70	64.84
152.81	60.16	99TH	167.00	65.75

* In ANSUR cervicale was defined as the highest point on the seventh cervical vertebra. For consistency with international standards, it is now the most prominent point on the seventh cervical vertebra.

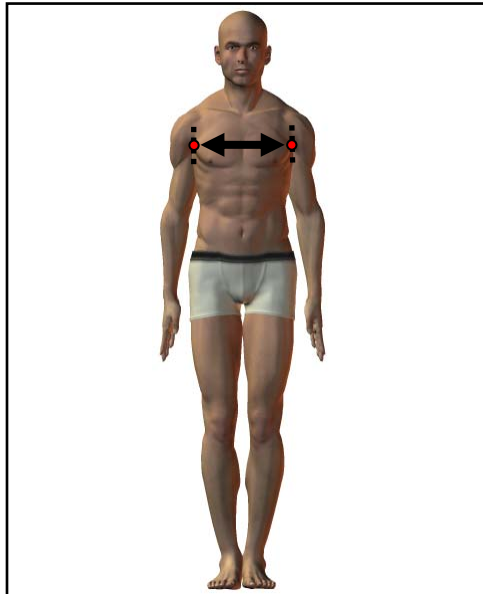
FEMALES		
<u>CM</u>		<u>IN</u>
139.13	MEAN	54.77
0.23	STD ERROR (MEAN)	0.09
5.70	STANDARD DEVIATION	2.24
0.16	STD ERROR (STD DEV)	0.06
124.80	MINIMUM	49.13
157.40	MAXIMUM	61.97
SKEWNESS		0.16
KURTOSIS		2.81
COEFFICIENT OF VARIATION		4.1%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
151.07	MEAN	59.48
0.18	STD ERROR (MEAN)	0.07
6.36	STANDARD DEVIATION	2.50
0.12	STD ERROR (STD DEV)	0.05
130.40	MINIMUM	51.34
171.20	MAXIMUM	67.40
SKEWNESS		0.19
KURTOSIS		2.96
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		1301

FREQUENCIES									
FEMALES					MALES				
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	
1	0.16	1	0.16	123.75	-				
5	0.81	6	0.97	125.25	-				
6	0.97	12	1.94	126.75	-				
17	2.74	29	4.68	128.25	-				
23	3.71	52	8.39	129.75	-				
33	5.32	85	13.71	131.25	-	1	0.08	1	0.08
47	7.58	132	21.29	132.75	-	0	0.00	1	0.08
50	8.06	182	29.35	134.25	-	4	0.31	5	0.38
46	7.42	228	36.77	135.75	-	0	0.00	5	0.38
63	10.16	291	46.94	137.25	-	4	0.31	9	0.69
74	11.94	365	58.87	138.75	-	11	0.85	20	1.54
55	8.87	420	67.74	140.25	-	27	2.08	47	3.61
55	8.87	475	76.61	141.75	-	46	3.54	93	7.15
45	7.26	520	83.87	143.25	-	48	3.69	141	10.84
34	5.48	554	89.35	144.75	-	77	5.92	218	16.76
21	3.39	575	92.74	146.25	-	67	5.15	285	21.91
19	3.06	594	95.81	147.75	-	113	8.69	398	30.59
11	1.77	605	97.58	149.25	-	122	9.38	520	39.97
9	1.45	614	99.03	150.75	-	123	9.45	643	49.42
3	0.48	617	99.52	152.25	-	127	9.76	770	59.19
2	0.32	619	99.84	153.75	-	120	9.22	890	68.41
0	0.00	619	99.84	155.25	-	91	6.99	981	75.40
1	0.16	620	100.00	156.75	-	79	6.07	1060	81.48
				157.25	-	59	4.53	1119	86.01
				158.25	-	58	4.46	1177	90.47
				159.75	-	41	3.15	1218	93.62
				161.25	-	33	2.54	1251	96.16
				162.75	-	16	1.23	1267	97.39
				164.25	-	16	1.23	1283	98.62
				165.75	-	6	0.46	1289	99.08
				167.25	-	8	0.61	1297	99.69
				168.75	-	2	0.15	1299	99.85
				170.25	-	2	0.15	1301	100.00
				171.75	-				

(24) CHEST BREADTH*

The maximum horizontal breadth of the chest at the level of the chest point anterior landmark is measured with a beam caliper. The participant stands erect, looking straight ahead with the heels together and the weight distributed evenly on both feet. The participant places both hands on the hips and takes a deep breath and holds it. The tissue is compressed with the beam caliper, and then the participant lowers the arms. The measurement is taken at maximum inspiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
22.50	8.86	1ST	24.40	9.61
22.90	9.02	2ND	24.90	9.80
23.16	9.12	3RD	25.10	9.88
23.50	9.25	5TH	25.61	10.08
23.90	9.41	10TH	26.30	10.35
24.30	9.57	15TH	26.60	10.47
24.60	9.69	20TH	27.00	10.63
24.80	9.76	25TH	27.25	10.73
25.10	9.88	30TH	27.50	10.83
25.30	9.96	35TH	27.80	10.94
25.50	10.04	40TH	28.00	11.02
25.70	10.12	45TH	28.20	11.10
25.90	10.20	50TH	28.40	11.18
26.10	10.28	55TH	28.60	11.26
26.30	10.35	60TH	28.90	11.38
26.50	10.43	65TH	29.10	11.46
26.80	10.55	70TH	29.40	11.57
27.10	10.67	75TH	29.70	11.69
27.40	10.79	80TH	29.90	11.77
27.80	10.94	85TH	30.30	11.93
28.39	11.18	90TH	30.70	12.09
28.80	11.34	95TH	31.50	12.40
29.34	11.55	97TH	31.90	12.56
29.50	11.61	98TH	32.50	12.80
30.44	11.98	99TH	33.40	13.15

*In ANSUR this measurement was taken (in males) at the level of the navel (nipple). This change was made in order to capture the breadth of the chest at its maximum. The landmark is unchanged for females. This measurement also differs from ANSUR because the tissue is now compressed and the measurement is taken at maximum inspiration.

(24) CHEST BREADTH

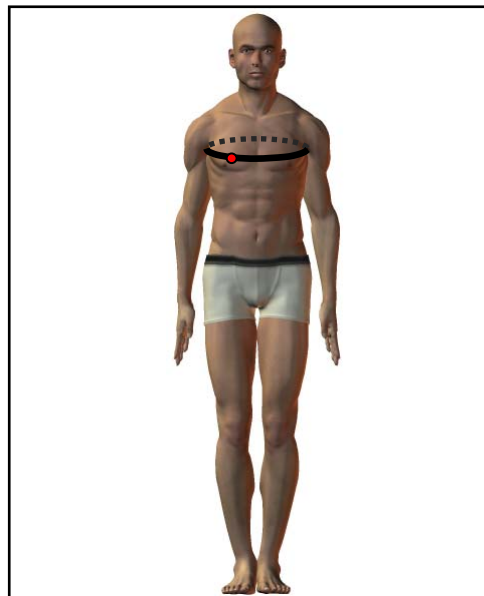
FEMALES		
<u>CM</u>		<u>IN</u>
26.00	MEAN	10.24
0.07	STD ERROR (MEAN)	0.03
1.65	STANDARD DEVIATION	0.65
0.05	STD ERROR (STD DEV)	0.02
22.00	MINIMUM	8.66
32.20	MAXIMUM	12.68
SKEWNESS		0.34
KURTOSIS		3.04
COEFFICIENT OF VARIATION		6.3%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
28.47	MEAN	11.21
0.05	STD ERROR (MEAN)	0.02
1.78	STANDARD DEVIATION	0.70
0.03	STD ERROR (STD DEV)	0.01
23.30	MINIMUM	9.17
34.30	MAXIMUM	13.50
SKEWNESS		0.17
KURTOSIS		3.13
COEFFICIENT OF VARIATION		6.3%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
2	0.32	2	0.32	21.75	-	22.25					
7	1.13	9	1.45	22.25	-	22.75					
12	1.94	21	3.39	22.75	-	23.25					
22	3.55	43	6.94	23.25	-	23.75		3	0.23	3	0.23
46	7.42	89	14.35	23.75	-	24.25		6	0.46	9	0.69
57	9.19	146	23.55	24.25	-	24.75		13	1.00	22	1.69
62	10.00	208	33.55	24.75	-	25.25		25	1.92	47	3.61
79	12.74	287	46.29	25.25	-	25.75		29	2.23	76	5.84
73	11.77	360	58.06	25.75	-	26.25		48	3.69	124	9.53
71	11.45	431	69.52	26.25	-	26.75		91	6.99	215	16.53
50	8.06	481	77.58	26.75	-	27.25		110	8.46	325	24.98
45	7.26	526	84.84	27.25	-	27.75		125	9.61	450	34.59
28	4.52	554	89.35	27.75	-	28.25		142	10.91	592	45.50
32	5.16	586	94.52	28.25	-	28.75		156	11.99	748	57.49
14	2.26	600	96.77	28.75	-	29.25		131	10.07	879	67.56
9	1.45	609	98.23	29.25	-	29.75		114	8.76	993	76.33
5	0.81	614	99.03	29.75	-	30.25		108	8.30	1101	84.63
3	0.48	617	99.52	30.25	-	30.75		77	5.92	1178	90.55
2	0.32	619	99.84	30.75	-	31.25		39	3.00	1217	93.54
0	0.00	619	99.84	31.25	-	31.75		36	2.77	1253	96.31
1	0.16	620	100.00	31.75	-	32.25		17	1.31	1270	97.62
				32.25	-	32.75		14	1.08	1284	98.69
				32.75	-	33.25		4	0.31	1288	99.00
				33.25	-	33.75		8	0.61	1296	99.62
				33.75	-	34.25		3	0.23	1299	99.85
				34.25	-	34.75		2	0.15	1301	100.00

(25) CHEST CIRCUMFERENCE*

The maximum horizontal circumference of the chest at the level of chest point, anterior, is measured with a tape. The participant stands erect, looking straight ahead. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
78.86	31.05	1ST	86.10	33.90
79.98	31.49	2ND	87.80	34.57
80.79	31.81	3RD	89.21	35.12
82.11	32.32	5TH	91.30	35.94
84.00	33.07	10TH	93.50	36.81
85.82	33.79	15TH	95.10	37.44
87.10	34.29	20TH	96.50	37.99
88.20	34.72	25TH	97.70	38.46
88.70	34.92	30TH	98.80	38.90
89.60	35.28	35TH	99.50	39.17
90.30	35.55	40TH	100.70	39.65
91.30	35.94	45TH	101.90	40.12
92.00	36.22	50TH	102.90	40.51
92.76	36.52	55TH	103.71	40.83
93.40	36.77	60TH	104.80	41.26
94.00	37.01	65TH	106.10	41.77
94.90	37.36	70TH	107.10	42.17
95.90	37.76	75TH	108.10	42.56
97.20	38.27	80TH	109.40	43.07
98.60	38.82	85TH	110.90	43.66
100.60	39.61	90TH	112.80	44.41
102.90	40.51	95TH	115.90	45.63
106.14	41.78	97TH	117.59	46.30
107.89	42.48	98TH	119.29	46.97
109.89	43.27	99TH	121.58	47.86

*In ANSUR this measurement was taken (in males) at the level of the nipple. This change was made in order to capture the depth of the chest at its maximum. The landmark is unchanged for females.

(25) CHEST CIRCUMFERENCE

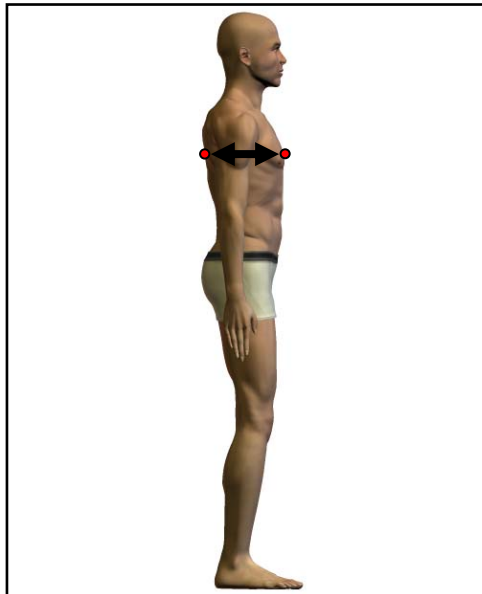
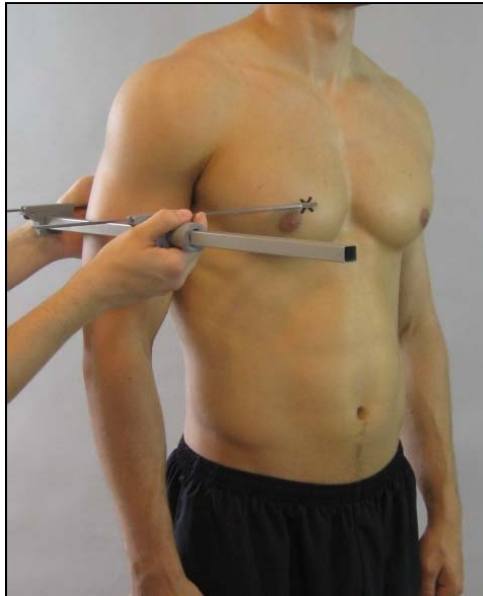
FEMALES		
<u>CM</u>		<u>IN</u>
92.20	MEAN	36.30
0.26	STD ERROR (MEAN)	0.10
6.40	STANDARD DEVIATION	2.52
0.18	STD ERROR (STD DEV)	0.07
75.50	MINIMUM	29.72
117.20	MAXIMUM	46.14
SKEWNESS		0.44
KURTOSIS		3.63
COEFFICIENT OF VARIATION		6.9%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
103.02	MEAN	40.56
0.21	STD ERROR (MEAN)	0.08
7.59	STANDARD DEVIATION	2.99
0.15	STD ERROR (STD DEV)	0.06
81.50	MINIMUM	32.09
129.10	MAXIMUM	50.83
SKEWNESS		0.16
KURTOSIS		2.91
COEFFICIENT OF VARIATION		7.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	75.25	-	76.75					
2	0.32	3	0.48	76.75	-	78.25					
8	1.29	11	1.77	78.25	-	79.75					
8	1.29	19	3.06	79.75	-	81.25					
26	4.19	45	7.26	81.25	-	82.75		1	0.08	1	0.08
22	3.55	67	10.81	82.75	-	84.25		3	0.23	4	0.31
23	3.71	90	14.52	84.25	-	85.75		6	0.46	10	0.77
36	5.81	126	20.32	85.75	-	87.25		9	0.69	19	1.46
61	9.84	187	30.16	87.25	-	88.75		16	1.23	35	2.69
57	9.19	244	39.35	88.75	-	90.25		16	1.23	51	3.92
54	8.71	298	48.06	90.25	-	91.75		22	1.69	73	5.61
66	10.65	364	58.71	91.75	-	93.25		50	3.84	123	9.45
67	10.81	431	69.52	93.25	-	94.75		57	4.38	180	13.84
40	6.45	471	75.97	94.75	-	96.25		69	5.30	249	19.14
35	5.65	506	81.61	96.25	-	97.75		85	6.53	334	25.67
37	5.97	543	87.58	97.75	-	99.25		97	7.46	431	33.13
18	2.90	561	90.48	99.25	-	100.75		92	7.07	523	40.20
22	3.55	583	94.03	100.75	-	102.25		86	6.61	609	46.81
13	2.10	596	96.13	102.25	-	103.75		107	8.22	716	55.03
4	0.65	600	96.77	103.75	-	105.25		86	6.61	802	61.64
6	0.97	606	97.74	105.25	-	106.75		89	6.84	891	68.49
3	0.48	609	98.23	106.75	-	108.25		88	6.76	979	75.25
5	0.81	614	99.03	108.25	-	109.75		74	5.69	1053	80.94
1	0.16	615	99.19	109.75	-	111.25		64	4.92	1117	85.86
1	0.16	616	99.35	111.25	-	112.75		48	3.69	1165	89.55
2	0.32	618	99.68	112.75	-	114.25		44	3.38	1209	92.93
1	0.16	619	99.84	114.25	-	115.75		24	1.84	1233	94.77
1	0.16	620	100.00	115.75	-	117.25		27	2.08	1260	96.85
				117.25	-	118.75		12	0.92	1272	97.77
				118.75	-	120.25		11	0.85	1283	98.62
				120.25	-	121.75		7	0.54	1290	99.15
				121.75	-	123.25		4	0.31	1294	99.46
				123.25	-	124.75		3	0.23	1297	99.69
				124.75	-	126.25		1	0.08	1298	99.77
				126.25	-	127.75		0	0.00	1298	99.77
				127.75	-	129.25		3	0.23	1301	100.00

(26) CHEST DEPTH*

The horizontal distance between the chest point anterior landmark and the back at the same level is measured with a beam caliper. The participant stands erect, looking straight ahead. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
19.30	7.60	1ST	19.80	7.80
19.84	7.81	2ND	20.10	7.91
20.00	7.87	3RD	20.50	8.07
20.40	8.03	5TH	21.00	8.27
21.10	8.31	10TH	21.70	8.54
21.50	8.46	15TH	22.20	8.74
22.00	8.66	20TH	22.60	8.90
22.30	8.78	25TH	23.00	9.06
22.60	8.90	30TH	23.30	9.17
23.00	9.06	35TH	23.60	9.29
23.30	9.17	40TH	24.00	9.45
23.50	9.25	45TH	24.30	9.57
23.70	9.33	50TH	24.60	9.69
24.00	9.45	55TH	24.80	9.76
24.20	9.53	60TH	25.10	9.88
24.60	9.69	65TH	25.33	9.97
24.90	9.80	70TH	25.70	10.12
25.10	9.88	75TH	26.00	10.24
25.50	10.04	80TH	26.40	10.39
25.90	10.20	85TH	26.90	10.59
26.50	10.43	90TH	27.40	10.79
27.60	10.87	95TH	28.20	11.10
28.48	11.21	97TH	28.60	11.26
29.00	11.42	98TH	29.00	11.42
29.50	11.61	99TH	29.60	11.65

*In ANSUR this measurement was taken (in males) at the level of the nipple. This change was made in order to capture the depth of the chest at its maximum. The landmark is unchanged for females.

(26) CHEST DEPTH

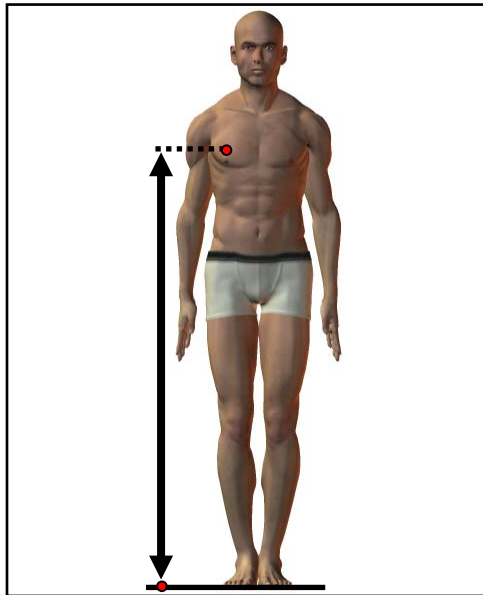
FEMALES		
<u>CM</u>		<u>IN</u>
23.82	MEAN	9.38
0.09	STD ERROR (MEAN)	0.03
2.16	STANDARD DEVIATION	0.85
0.06	STD ERROR (STD DEV)	0.02
18.10	MINIMUM	7.13
31.70	MAXIMUM	12.48
SKEWNESS		0.37
KURTOSIS		3.39
COEFFICIENT OF VARIATION		9.1%
NUMBER OF PARTICIPANTS		619

MALES		
<u>CM</u>		<u>IN</u>
24.54	MEAN	9.66
0.06	STD ERROR (MEAN)	0.02
2.19	STANDARD DEVIATION	0.86
0.04	STD ERROR (STD DEV)	0.02
18.60	MINIMUM	7.32
31.30	MAXIMUM	12.32
SKEWNESS		0.09
KURTOSIS		2.70
COEFFICIENT OF VARIATION		8.9%
NUMBER OF PARTICIPANTS		1301

FEMALES						FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	17.75	- 18.25	1	0.08	1	0.08				
1	0.16	2	0.32	18.25	- 18.75	3	0.23	4	0.31				
2	0.32	4	0.65	18.75	- 19.25	7	0.54	11	0.85				
5	0.81	9	1.45	19.25	- 19.75	20	1.54	31	2.38				
15	2.42	24	3.88	19.75	- 20.25	18	1.38	49	3.77				
21	3.39	45	7.27	20.25	- 20.75	36	2.77	85	6.53				
26	4.20	71	11.47	20.75	- 21.25	53	4.07	138	10.61				
37	5.98	108	17.45	21.25	- 21.75	64	4.92	202	15.53				
39	6.30	147	23.75	21.75	- 22.25	82	6.30	284	21.83				
54	8.72	201	32.47	22.25	- 22.75	100	7.69	384	29.52				
38	6.14	239	38.61	22.75	- 23.25	95	7.30	479	36.82				
73	11.79	312	50.40	23.25	- 23.75	99	7.61	578	44.43				
60	9.69	372	60.10	23.75	- 24.25	122	9.38	700	53.80				
47	7.59	419	67.69	24.25	- 24.75	124	9.53	824	63.34				
55	8.89	474	76.58	24.75	- 25.25	99	7.61	923	70.95				
45	7.27	519	83.84	25.25	- 25.75	93	7.15	1016	78.09				
27	4.36	546	88.21	25.75	- 26.25	69	5.30	1085	83.40				
25	4.04	571	92.25	26.25	- 26.75	71	5.46	1156	88.85				
11	1.78	582	94.02	26.75	- 27.25	40	3.07	1196	91.93				
10	1.62	592	95.64	27.25	- 27.75	42	3.23	1238	95.16				
7	1.13	599	96.77	27.75	- 28.25	28	2.15	1266	97.31				
3	0.48	602	97.25	28.25	- 28.75	17	1.31	1283	98.62				
9	1.45	611	98.71	28.75	- 29.25	7	0.54	1290	99.15				
4	0.65	615	99.35	29.25	- 29.75	5	0.38	1295	99.54				
0	0.00	615	99.35	29.75	- 30.25	4	0.31	1299	99.85				
1	0.16	616	99.52	30.25	- 30.75	1	0.08	1300	99.92				
2	0.32	618	99.84	30.75	- 31.25	1	0.08	1301	100.00				
1	0.16	619	100.00	31.25	- 31.75								

(27) CHEST HEIGHT*

The vertical distance between a standing surface and the chest point anterior landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
105.16	41.41	1ST	116.50	45.87
106.78	42.04	2ND	118.00	46.46
108.00	42.52	3RD	118.90	46.81
109.10	42.95	5TH	120.11	47.28
110.31	43.43	10TH	122.00	48.03
111.60	43.94	15TH	123.00	48.43
112.90	44.45	20TH	124.00	48.82
113.60	44.72	25TH	125.00	49.21
114.50	45.08	30TH	125.80	49.53
115.20	45.35	35TH	126.70	49.88
115.60	45.51	40TH	127.50	50.20
116.50	45.87	45TH	128.10	50.43
117.20	46.14	50TH	128.90	50.75
117.86	46.40	55TH	129.50	50.98
118.40	46.61	60TH	130.20	51.26
119.20	46.93	65TH	131.10	51.61
119.97	47.23	70TH	131.90	51.93
120.90	47.60	75TH	132.80	52.28
121.58	47.86	80TH	133.90	52.72
122.60	48.27	85TH	135.40	53.31
123.90	48.78	90TH	137.00	53.94
125.90	49.57	95TH	139.09	54.76
127.00	50.00	97TH	140.80	55.43
127.47	50.19	98TH	141.60	55.75
129.77	51.09	99TH	143.60	56.54

*In ANSUR this measurement was taken (in males) at the level of thelion (nipple). This change was made in order to capture the height of the chest at its maximum. The landmark is unchanged for females.

(27) CHEST HEIGHT

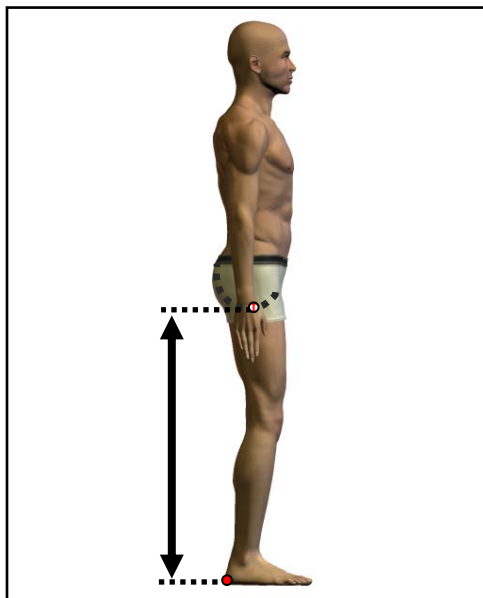
FEMALES		
CM		IN
117.22	MEAN	46.15
0.21	STD ERROR (MEAN)	0.08
5.18	STANDARD DEVIATION	2.04
0.15	STD ERROR (STD DEV)	0.06
101.80	MINIMUM	40.08
133.80	MAXIMUM	52.68
SKEWNESS		0.04
KURTOSIS		2.85
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
129.10	MEAN	50.83
0.16	STD ERROR (MEAN)	0.06
5.84	STANDARD DEVIATION	2.30
0.11	STD ERROR (STD DEV)	0.05
111.50	MINIMUM	43.90
147.80	MAXIMUM	58.19
SKEWNESS		0.23
KURTOSIS		2.98
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES		MALES			
E	FPct	CumF	CumFPct	CM		E	FPct	CumF	CumFPct
1	0.16	1	0.16	101.55	-	102.55			
2	0.32	3	0.48	102.55	-	103.55			
1	0.16	4	0.65	103.55	-	104.55			
3	0.48	7	1.13	104.55	-	105.55			
4	0.65	11	1.77	105.55	-	106.55			
6	0.97	17	2.74	106.55	-	107.55			
7	1.13	24	3.87	107.55	-	108.55			
18	2.90	42	6.77	108.55	-	109.55			
23	3.71	65	10.48	109.55	-	110.55			
26	4.19	91	14.68	110.55	-	111.55	1	0.08	0.08
27	4.35	118	19.03	111.55	-	112.55	0	0.00	0.08
32	5.16	150	24.19	112.55	-	113.55	2	0.15	0.23
41	6.61	191	30.81	113.55	-	114.55	3	0.23	0.46
49	7.90	240	38.71	114.55	-	115.55	1	0.08	0.54
42	6.77	282	45.48	115.55	-	116.55	6	0.46	1.00
43	6.94	325	52.42	116.55	-	117.55	8	0.61	1.61
56	9.03	381	61.45	117.55	-	118.55	15	1.15	2.77
37	5.97	418	67.42	118.55	-	119.55	15	1.15	3.92
31	5.00	449	72.42	119.55	-	120.55	31	2.38	6.30
47	7.58	496	80.00	120.55	-	121.55	31	2.38	8.69
29	4.68	525	84.68	121.55	-	122.55	51	3.92	12.61
26	4.19	551	88.87	122.55	-	123.55	65	5.00	17.60
15	2.42	566	91.29	123.55	-	124.55	60	4.61	22.21
19	3.06	585	94.35	124.55	-	125.55	78	6.00	28.21
13	2.10	598	96.45	125.55	-	126.55	72	5.53	33.74
10	1.61	608	98.06	126.55	-	127.55	87	6.69	40.43
4	0.65	612	98.71	127.55	-	128.55	97	7.46	47.89
2	0.32	614	99.03	128.55	-	129.55	97	7.46	55.34
4	0.65	618	99.68	129.55	-	130.55	83	6.38	61.72
1	0.16	619	99.84	130.55	-	131.55	86	6.61	68.33
0	0.00	619	99.84	131.55	-	132.55	70	5.38	73.71
0	0.00	619	99.84	132.55	-	133.55	70	5.38	79.09
1	0.16	620	100.00	133.55	-	134.55	38	2.92	82.01
				134.55	-	135.55	45	3.46	85.47
				135.55	-	136.55	38	2.92	88.39
				136.55	-	137.55	40	3.07	91.47
				137.55	-	138.55	29	2.23	93.70
				138.55	-	139.55	27	2.08	95.77
				139.55	-	140.55	12	0.92	96.69
				140.55	-	141.55	15	1.15	97.85
				141.55	-	142.55	8	0.61	98.46
				142.55	-	143.55	7	0.54	99.00
				143.55	-	144.55	6	0.46	99.46
				144.55	-	145.55	1	0.08	99.54
				145.55	-	146.55	1	0.08	99.62
				146.55	-	147.55	2	0.15	99.77
				147.55	-	148.55	3	0.23	100.00

(28) CROTCH HEIGHT

The vertical distance between the standing surface and the crotch is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together, and the weight is distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
70.64	27.81	1ST	75.90	29.88
70.94	27.93	2ND	76.80	30.24
71.50	28.15	3RD	77.21	30.39
72.20	28.43	5TH	78.30	30.83
73.11	28.78	10TH	79.70	31.38
74.20	29.21	15TH	80.60	31.73
74.94	29.51	20TH	81.44	32.07
75.70	29.80	25TH	82.20	32.36
76.43	30.09	30TH	82.90	32.64
77.04	30.32	35TH	83.60	32.91
77.80	30.63	40TH	84.20	33.15
78.30	30.83	45TH	84.70	33.35
78.70	30.98	50TH	85.20	33.54
79.30	31.22	55TH	85.80	33.78
79.70	31.38	60TH	86.40	34.02
80.30	31.61	65TH	87.00	34.25
80.97	31.88	70TH	87.84	34.59
81.50	32.09	75TH	88.65	34.90
82.20	32.36	80TH	89.50	35.24
82.79	32.59	85TH	90.40	35.59
83.69	32.95	90TH	91.60	36.06
85.20	33.54	95TH	93.40	36.77
86.47	34.05	97TH	94.69	37.28
87.56	34.47	98TH	95.50	37.60
88.46	34.82	99TH	97.20	38.27

(28) CROTCH HEIGHT

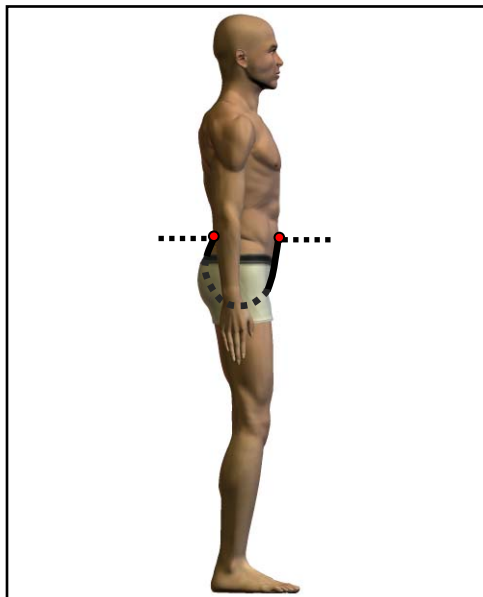
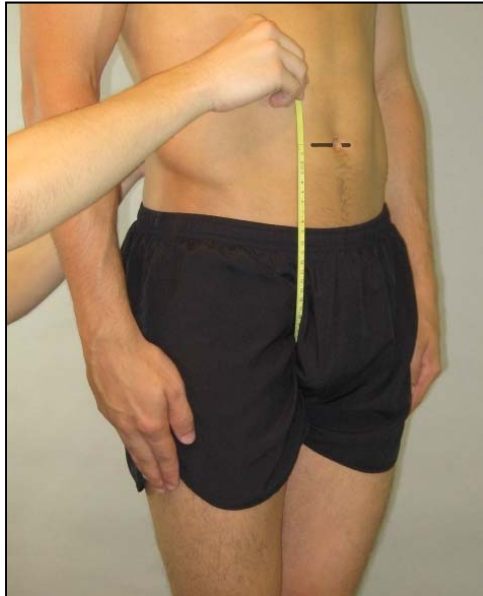
FEMALES		
CM		IN
78.69	MEAN	30.98
0.16	STD ERROR (MEAN)	0.06
4.05	STANDARD DEVIATION	1.59
0.12	STD ERROR (STD DEV)	0.05
68.60	MINIMUM	27.01
92.80	MAXIMUM	36.54
SKEWNESS		0.16
KURTOSIS		2.91
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
85.49	MEAN	33.66
0.13	STD ERROR (MEAN)	0.05
4.63	STANDARD DEVIATION	1.82
0.09	STD ERROR (STD DEV)	0.04
71.30	MINIMUM	28.07
100.80	MAXIMUM	39.69
SKEWNESS		0.21
KURTOSIS		2.88
COEFFICIENT OF VARIATION		5.4%
NUMBER OF PARTICIPANTS		1301

FREQUENCIES											
FEMALES								MALES			
F	FPct	CumF	CumFPct	CM				F	FPct	CumF	CumFPct
3	0.48	3	0.48	68.55	-	69.55					
2	0.32	5	0.81	69.55	-	70.55					
14	2.26	19	3.06	70.55	-	71.55		1	0.08	1	0.08
23	3.71	42	6.77	71.55	-	72.55		1	0.08	2	0.15
30	4.84	72	11.61	72.55	-	73.55		1	0.08	3	0.23
37	5.97	109	17.58	73.55	-	74.55		4	0.31	7	0.54
41	6.61	150	24.19	74.55	-	75.55		2	0.15	9	0.69
41	6.61	191	30.81	75.55	-	76.55		9	0.69	18	1.38
49	7.90	240	38.71	76.55	-	77.55		27	2.08	45	3.46
57	9.19	297	47.90	77.55	-	78.55		28	2.15	73	5.61
66	10.65	363	58.55	78.55	-	79.55		52	4.00	125	9.61
51	8.23	414	66.77	79.55	-	80.55		66	5.07	191	14.68
55	8.87	469	75.65	80.55	-	81.55		77	5.92	268	20.60
50	8.06	519	83.71	81.55	-	82.55		93	7.15	361	27.75
36	5.81	555	89.52	82.55	-	83.55		92	7.07	453	34.82
23	3.71	578	93.23	83.55	-	84.55		107	8.22	560	43.04
15	2.42	593	95.65	84.55	-	85.55		120	9.22	680	52.27
9	1.45	602	97.10	85.55	-	86.55		116	8.92	796	61.18
6	0.97	608	98.06	86.55	-	87.55		88	6.76	884	67.95
7	1.13	615	99.19	87.55	-	88.55		83	6.38	967	74.33
1	0.16	616	99.35	88.55	-	89.55		77	5.92	1044	80.25
1	0.16	617	99.52	89.55	-	90.55		76	5.84	1120	86.09
1	0.16	618	99.68	90.55	-	91.55		49	3.77	1169	89.85
1	0.16	619	99.84	91.55	-	92.55		43	3.31	1212	93.16
1	0.16	620	100.00	92.55	-	93.55		27	2.08	1239	95.23
				93.55	-	94.55		21	1.61	1260	96.85
				94.55	-	95.55		16	1.23	1276	98.08
				95.55	-	96.55		8	0.61	1284	98.69
				96.55	-	97.55		8	0.61	1292	99.31
				97.55	-	98.55		6	0.46	1298	99.77
				98.55	-	99.55		1	0.08	1299	99.85
				99.55	-	100.55		1	0.08	1300	99.92
				100.55	-	101.55		1	0.08	1301	100.00

(29) CROTCH LENGTH (OMPHALION)

The distance between the abdomen at the level of the omphalion landmark to the same level on the back is measured with a tape passing through the crotch to the right of the genitalia. The tape is held vertically both in front and in back. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
50.88	20.03	1ST	54.60	21.50
53.04	20.89	2ND	55.70	21.93
53.36	21.01	3RD	56.31	22.17
54.41	21.42	5TH	57.50	22.64
55.90	22.01	10TH	59.20	23.31
56.90	22.40	15TH	60.20	23.70
57.62	22.69	20TH	61.10	24.06
58.00	22.83	25TH	61.80	24.33
58.43	23.00	30TH	62.30	24.53
59.10	23.27	35TH	62.90	24.76
59.54	23.44	40TH	63.30	24.92
60.00	23.62	45TH	63.80	25.12
60.40	23.78	50TH	64.30	25.31
60.90	23.98	55TH	64.90	25.55
61.40	24.17	60TH	65.40	25.75
61.80	24.33	65TH	66.00	25.98
62.30	24.53	70TH	66.70	26.26
62.98	24.79	75TH	67.40	26.54
63.60	25.04	80TH	68.10	26.81
64.50	25.39	85TH	68.90	27.13
65.30	25.71	90TH	70.00	27.56
66.50	26.18	95TH	71.70	28.23
68.07	26.80	97TH	72.80	28.66
69.10	27.20	98TH	73.50	28.94
70.17	27.63	99TH	74.80	29.45

(29) CROTCH LENGTH (OMPHALION)

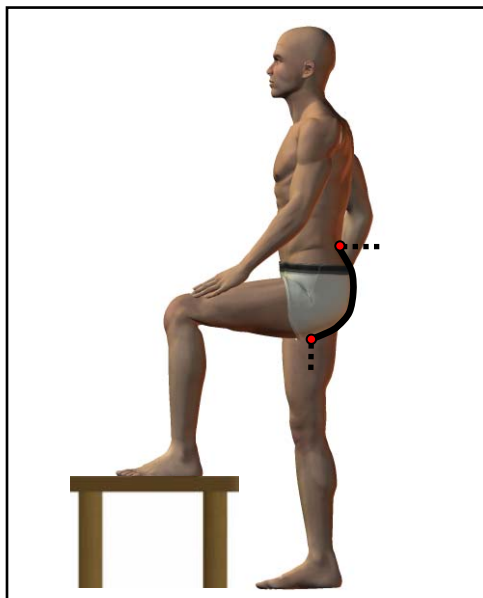
FEMALES		
<u>CM</u>		<u>IN</u>
60.56	MEAN	23.84
0.15	STD ERROR (MEAN)	0.06
3.81	STANDARD DEVIATION	1.50
0.11	STD ERROR (STD DEV)	0.04
48.50	MINIMUM	19.09
76.00	MAXIMUM	29.92
SKEWNESS		0.19
KURTOSIS		3.72
COEFFICIENT OF VARIATION		6.3%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
64.55	MEAN	25.41
0.12	STD ERROR (MEAN)	0.05
4.31	STANDARD DEVIATION	1.70
0.08	STD ERROR (STD DEV)	0.03
53.30	MINIMUM	20.98
82.40	MAXIMUM	32.44
SKEWNESS		0.24
KURTOSIS		3.42
COEFFICIENT OF VARIATION		6.7%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	47.55	-	48.55					
1	0.16	2	0.32	48.55	-	49.55					
2	0.32	4	0.65	49.55	-	50.55					
3	0.48	7	1.13	50.55	-	51.55					
1	0.16	8	1.29	51.55	-	52.55					
13	2.10	21	3.39	52.55	-	53.55		2	0.15	2	0.15
13	2.10	34	5.48	53.55	-	54.55		10	0.77	12	0.92
19	3.06	53	8.55	54.55	-	55.55		12	0.92	24	1.84
28	4.52	81	13.06	55.55	-	56.55		18	1.38	42	3.23
38	6.13	119	19.19	56.55	-	57.55		24	1.84	66	5.07
72	11.61	191	30.81	57.55	-	58.55		31	2.38	97	7.46
57	9.19	248	40.00	58.55	-	59.55		53	4.07	150	11.53
70	11.29	318	51.29	59.55	-	60.55		69	5.30	219	16.83
69	11.13	387	62.42	60.55	-	61.55		85	6.53	304	23.37
60	9.68	447	72.10	61.55	-	62.55		121	9.30	425	32.67
45	7.26	492	79.35	62.55	-	63.55		115	8.84	540	41.51
36	5.81	528	85.16	63.55	-	64.55		134	10.30	674	51.81
40	6.45	568	91.61	64.55	-	65.55		125	9.61	799	61.41
23	3.71	591	95.32	65.55	-	66.55		110	8.46	909	69.87
8	1.29	599	96.61	66.55	-	67.55		82	6.30	991	76.17
4	0.65	603	97.26	67.55	-	68.55		84	6.46	1075	82.63
9	1.45	612	98.71	68.55	-	69.55		69	5.30	1144	87.93
4	0.65	616	99.35	69.55	-	70.55		46	3.54	1190	91.47
1	0.16	617	99.52	70.55	-	71.55		41	3.15	1231	94.62
0	0.00	617	99.52	71.55	-	72.55		29	2.23	1260	96.85
1	0.16	618	99.68	72.55	-	73.55		16	1.23	1276	98.08
0	0.00	618	99.68	73.55	-	74.55		11	0.85	1287	98.92
1	0.16	619	99.84	74.55	-	75.55		4	0.31	1291	99.23
1	0.16	620	100.00	75.55	-	76.55		3	0.23	1294	99.46
				76.55	-	77.55		0	0.00	1294	99.46
				77.55	-	78.55		0	0.00	1294	99.46
				78.55	-	79.55		3	0.23	1297	99.69
				79.55	-	80.55		1	0.08	1298	99.77
				80.55	-	81.55		2	0.15	1300	99.92
				81.55	-	82.55		1	0.08	1301	100.00

(30) CROTCH LENGTH, POSTERIOR (OMPHALION)

The surface distance from the crotch at the inner thigh landmark to the omphalion posterior landmark is measured with a tape. The tape passes between the buttocks to the back of the waist. The participant stands with the left foot on a platform so that the knee is flexed.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
27.88	10.97	1ST	29.50	11.61
28.50	11.22	2ND	30.50	12.01
29.00	11.42	3RD	31.10	12.24
29.70	11.69	5TH	31.80	12.52
30.81	12.13	10TH	32.40	12.76
31.52	12.41	15TH	33.00	12.99
32.10	12.64	20TH	33.52	13.20
32.50	12.80	25TH	34.10	13.43
33.00	12.99	30TH	34.40	13.54
33.40	13.15	35TH	34.90	13.74
33.70	13.27	40TH	35.30	13.90
34.00	13.39	45TH	35.60	14.02
34.40	13.54	50TH	35.90	14.13
34.80	13.70	55TH	36.30	14.29
35.16	13.84	60TH	36.70	14.45
35.60	14.02	65TH	37.10	14.61
36.00	14.17	70TH	37.40	14.72
36.30	14.29	75TH	37.90	14.92
36.70	14.45	80TH	38.30	15.08
37.20	14.65	85TH	38.80	15.28
37.80	14.88	90TH	39.50	15.55
38.70	15.24	95TH	40.50	15.94
39.20	15.43	97TH	41.30	16.26
39.50	15.55	98TH	41.80	16.46
40.90	16.10	99TH	42.90	16.89

(30) CROTCH LENGTH, POSTERIOR (OMPHALION)

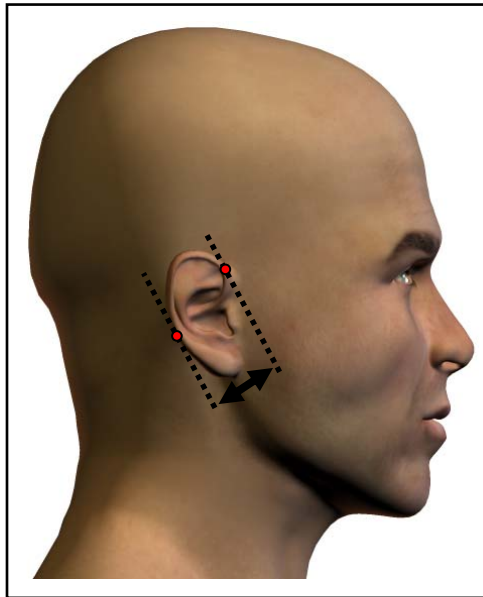
FEMALES		
CM		IN
34.38	MEAN	13.54
0.11	STD ERROR (MEAN)	0.04
2.75	STANDARD DEVIATION	1.08
0.08	STD ERROR (STD DEV)	0.03
24.20	MINIMUM	9.53
42.70	MAXIMUM	16.81
SKEWNESS		-0.17
KURTOSIS		3.07
COEFFICIENT OF VARIATION		8.0%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
36.00	MEAN	14.17
0.08	STD ERROR (MEAN)	0.03
2.74	STANDARD DEVIATION	1.08
0.05	STD ERROR (STD DEV)	0.02
27.90	MINIMUM	10.98
45.20	MAXIMUM	17.80
SKEWNESS		0.11
KURTOSIS		2.96
COEFFICIENT OF VARIATION		7.6%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	23.75	-	24.25					
0	0.00	1	0.16	24.25	-	24.75					
0	0.00	1	0.16	24.75	-	25.25					
0	0.00	1	0.16	25.25	-	25.75					
1	0.16	2	0.32	25.75	-	26.25					
1	0.16	3	0.48	26.25	-	26.75					
1	0.16	4	0.65	26.75	-	27.25					
1	0.16	5	0.81	27.25	-	27.75					
2	0.32	7	1.13	27.75	-	28.25		2	0.15	2	0.15
6	0.97	13	2.10	28.25	-	28.75		3	0.23	5	0.38
10	1.61	23	3.71	28.75	-	29.25		3	0.23	8	0.62
9	1.45	32	5.16	29.25	-	29.75		5	0.38	13	1.00
12	1.94	44	7.10	29.75	-	30.25		5	0.38	18	1.38
15	2.42	59	9.52	30.25	-	30.75		9	0.69	27	2.08
21	3.39	80	12.90	30.75	-	31.25		16	1.23	43	3.31
28	4.52	108	17.42	31.25	-	31.75		21	1.62	64	4.92
20	3.23	128	20.65	31.75	-	32.25		36	2.77	100	7.69
38	6.13	166	26.77	32.25	-	32.75		57	4.38	157	12.08
36	5.81	202	32.58	32.75	-	33.25		66	5.08	223	17.15
48	7.74	250	40.32	33.25	-	33.75		52	4.00	275	21.15
42	6.77	292	47.10	33.75	-	34.25		78	6.00	353	27.15
45	7.26	337	54.35	34.25	-	34.75		75	5.77	428	32.92
44	7.10	381	61.45	34.75	-	35.25		88	6.77	516	39.69
30	4.84	411	66.29	35.25	-	35.75		89	6.85	605	46.54
49	7.90	460	74.19	35.75	-	36.25		92	7.08	697	53.62
37	5.97	497	80.16	36.25	-	36.75		84	6.46	781	60.08
35	5.65	532	85.81	36.75	-	37.25		106	8.15	887	68.23
19	3.06	551	88.87	37.25	-	37.75		72	5.54	959	73.77
24	3.87	575	92.74	37.75	-	38.25		75	5.77	1034	79.54
16	2.58	591	95.32	38.25	-	38.75		58	4.46	1092	84.00
13	2.10	604	97.42	38.75	-	39.25		54	4.15	1146	88.15
5	0.81	609	98.23	39.25	-	39.75		41	3.15	1187	91.31
2	0.32	611	98.55	39.75	-	40.25		36	2.77	1223	94.08
3	0.48	614	99.03	40.25	-	40.75		19	1.46	1242	95.54
3	0.48	617	99.52	40.75	-	41.25		15	1.15	1257	96.69
1	0.16	618	99.68	41.25	-	41.75		17	1.31	1274	98.00
1	0.16	619	99.84	41.75	-	42.25		10	0.77	1284	98.77
1	0.16	620	100.00	42.25	-	42.75		2	0.15	1286	98.92
				42.75	-	43.25		9	0.69	1295	99.62
				43.25	-	43.75		1	0.08	1296	99.69
				43.75	-	44.25		0	0.00	1296	99.69
				44.25	-	44.75		2	0.15	1298	99.85
				44.75	-	45.25		2	0.15	1300	100.00

(31) EAR BREADTH

The maximum breadth of the right ear perpendicular to its long axis is measured with a sliding caliper.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
2.80	1.10	1ST	3.00	1.18
2.84	1.12	2ND	3.10	1.22
2.90	1.14	3RD	3.10	1.22
2.90	1.14	5TH	3.20	1.26
3.10	1.22	10TH	3.30	1.30
3.10	1.22	15TH	3.30	1.30
3.10	1.22	20TH	3.40	1.34
3.20	1.26	25TH	3.40	1.34
3.20	1.26	30TH	3.50	1.38
3.20	1.26	35TH	3.50	1.38
3.30	1.30	40TH	3.50	1.38
3.30	1.30	45TH	3.60	1.42
3.30	1.30	50TH	3.60	1.42
3.40	1.34	55TH	3.60	1.42
3.40	1.34	60TH	3.70	1.46
3.40	1.34	65TH	3.70	1.46
3.50	1.38	70TH	3.70	1.46
3.50	1.38	75TH	3.80	1.50
3.50	1.38	80TH	3.80	1.50
3.60	1.42	85TH	3.90	1.54
3.70	1.46	90TH	4.00	1.57
3.80	1.50	95TH	4.10	1.61
3.80	1.50	97TH	4.10	1.61
3.90	1.54	98TH	4.20	1.65
3.90	1.54	99TH	4.30	1.69

(31) EAR BREADTH

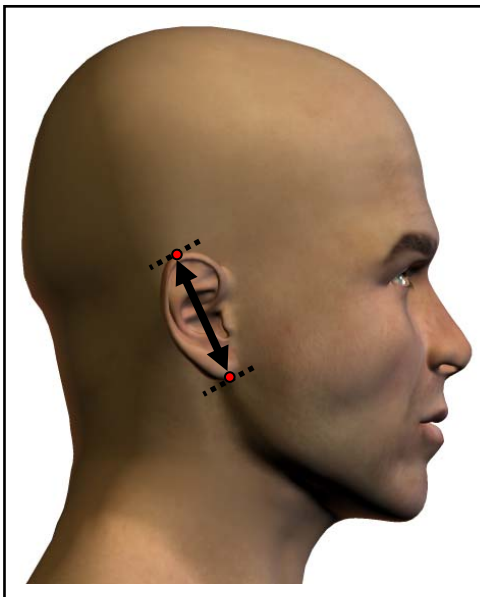
FEMALES		
<u>CM</u>		<u>IN</u>
3.34	MEAN	1.32
0.01	STD ERROR (MEAN)	0.00
0.25	STANDARD DEVIATION	0.10
0.01	STD ERROR (STD DEV)	0.00
2.70	MINIMUM	1.06
4.10	MAXIMUM	1.61
SKEWNESS		0.16
KURTOSIS		2.94
COEFFICIENT OF VARIATION		7.5%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
3.61	MEAN	1.42
0.01	STD ERROR (MEAN)	0.00
0.27	STANDARD DEVIATION	0.10
0.01	STD ERROR (STD DEV)	0.00
2.90	MINIMUM	1.14
4.60	MAXIMUM	1.81
SKEWNESS		0.31
KURTOSIS		3.14
COEFFICIENT OF VARIATION		7.5%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
3	0.48	3	0.48	2.65	-	2.75		4	0.31	4	0.31
9	1.45	12	1.94	2.75	-	2.85		11	0.85	15	1.15
24	3.87	36	5.81	2.85	-	2.95		26	2.00	41	3.15
24	3.87	60	9.68	2.95	-	3.05		50	3.84	91	6.99
68	10.97	128	20.65	3.05	-	3.15		132	10.15	223	17.14
99	15.97	227	36.61	3.15	-	3.25		140	10.76	363	27.90
104	16.77	331	53.39	3.25	-	3.35		208	15.99	571	43.89
95	15.32	426	68.71	3.35	-	3.45		184	14.14	755	58.03
71	11.45	497	80.16	3.45	-	3.55		193	14.83	948	72.87
52	8.39	549	88.55	3.55	-	3.65		107	8.22	1055	81.09
36	5.81	585	94.35	3.65	-	3.75		107	8.22	1162	89.32
20	3.23	605	97.58	3.75	-	3.85		73	5.61	1235	94.93
10	1.61	615	99.19	3.85	-	3.95		35	2.69	1270	97.62
4	0.65	619	99.84	3.95	-	4.05		10	0.77	1280	98.39
1	0.16	620	100.00	4.05	-	4.15		10	0.77	1290	99.15
				4.15	-	4.25		9	0.69	1299	99.85
				4.25	-	4.35		1	0.08	1300	99.92
				4.35	-	4.45		1	0.08	1301	100.00
				4.45	-	4.55					
				4.55	-	4.65					

(32) EAR LENGTH

The length of the right ear, from its highest to lowest points on a line parallel to the long axis of the ear, is measured with a sliding caliper.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
5.10	2.01	1ST	5.50	2.17
5.20	2.05	2ND	5.60	2.20
5.30	2.09	3RD	5.70	2.24
5.40	2.13	5TH	5.80	2.28
5.50	2.17	10TH	6.00	2.36
5.60	2.20	15TH	6.00	2.36
5.70	2.24	20TH	6.10	2.40
5.70	2.24	25TH	6.20	2.44
5.80	2.28	30TH	6.20	2.44
5.80	2.28	35TH	6.30	2.48
5.90	2.32	40TH	6.40	2.52
5.90	2.32	45TH	6.40	2.52
6.00	2.36	50TH	6.50	2.56
6.00	2.36	55TH	6.50	2.56
6.10	2.40	60TH	6.50	2.56
6.10	2.40	65TH	6.60	2.60
6.10	2.40	70TH	6.70	2.64
6.20	2.44	75TH	6.70	2.64
6.30	2.48	80TH	6.80	2.68
6.40	2.52	85TH	6.90	2.72
6.50	2.56	90TH	7.00	2.76
6.70	2.64	95TH	7.10	2.80
6.70	2.64	97TH	7.30	2.87
6.80	2.68	98TH	7.30	2.87
6.80	2.68	99TH	7.50	2.95

(32) EAR LENGTH

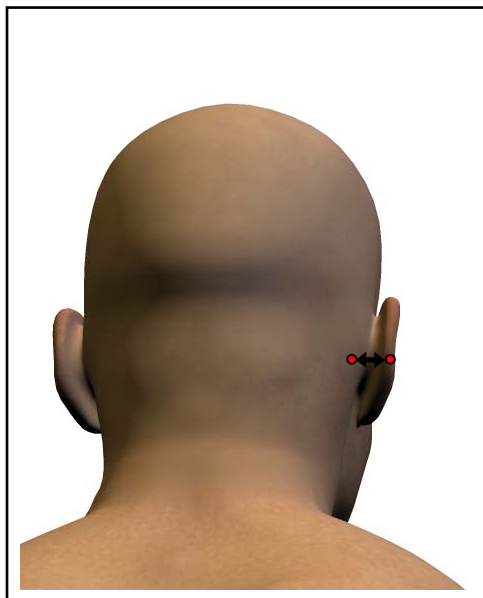
FEMALES		
<u>CM</u>		<u>IN</u>
5.98	MEAN	2.35
0.02	STD ERROR (MEAN)	0.01
0.38	STANDARD DEVIATION	0.15
0.01	STD ERROR (STD DEV)	0.00
4.70	MINIMUM	1.85
7.30	MAXIMUM	2.87
SKEWNESS		0.11
KURTOSIS		3.22
COEFFICIENT OF VARIATION		6.4%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
6.47	MEAN	2.55
0.01	STD ERROR (MEAN)	0.00
0.41	STANDARD DEVIATION	0.16
0.01	STD ERROR (STD DEV)	0.00
5.20	MINIMUM	2.05
7.90	MAXIMUM	3.11
SKEWNESS		0.11
KURTOSIS		3.06
COEFFICIENT OF VARIATION		6.3%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES			MALES			
E	FPct	CumF	CumFPct		CM		E	FPct	CumF	CumFPct
1	0.16	1	0.16	4.65	-	4.75				
0	0.00	1	0.16	4.75	-	4.85				
1	0.16	2	0.32	4.85	-	4.95				
2	0.32	4	0.65	4.95	-	5.05				
5	0.81	9	1.45	5.05	-	5.15				
5	0.81	14	2.26	5.15	-	5.25	1	0.08	1	0.08
10	1.61	24	3.87	5.25	-	5.35	3	0.23	4	0.31
14	2.26	38	6.13	5.35	-	5.45	3	0.23	7	0.54
41	6.61	79	12.74	5.45	-	5.55	7	0.54	14	1.08
38	6.13	117	18.87	5.55	-	5.65	12	0.92	26	2.00
44	7.10	161	25.97	5.65	-	5.75	20	1.54	46	3.54
63	10.16	224	36.13	5.75	-	5.85	31	2.38	77	5.92
59	9.52	283	45.65	5.85	-	5.95	31	2.38	108	8.30
85	13.71	368	59.35	5.95	-	6.05	104	7.99	212	16.30
69	11.13	437	70.48	6.05	-	6.15	76	5.84	288	22.14
43	6.94	480	77.42	6.15	-	6.25	103	7.92	391	30.05
40	6.45	520	83.87	6.25	-	6.35	119	9.15	510	39.20
29	4.68	549	88.55	6.35	-	6.45	115	8.84	625	48.04
25	4.03	574	92.58	6.45	-	6.55	159	12.22	784	60.26
14	2.26	588	94.84	6.55	-	6.65	102	7.84	886	68.10
18	2.90	606	97.74	6.65	-	6.75	115	8.84	1001	76.94
9	1.45	615	99.19	6.75	-	6.85	84	6.46	1085	83.40
2	0.32	617	99.52	6.85	-	6.95	50	3.84	1135	87.24
1	0.16	618	99.68	6.95	-	7.05	69	5.30	1204	92.54
0	0.00	618	99.68	7.05	-	7.15	41	3.15	1245	95.70
1	0.16	619	99.84	7.15	-	7.25	16	1.23	1261	96.93
1	0.16	620	100.00	7.25	-	7.35	15	1.15	1276	98.08
				7.35	-	7.45	9	0.69	1285	98.77
				7.45	-	7.55	10	0.77	1295	99.54
				7.55	-	7.65	3	0.23	1298	99.77
				7.65	-	7.75	2	0.15	1300	99.92
				7.75	-	7.85	0	0.00	1300	99.92
				7.85	-	7.95	1	0.08	1301	100.00

(33) EAR PROTRUSION

The horizontal distance between the mastoid process and the outside edge of the right ear at its most lateral point is measured using a sliding caliper with its slide reversed.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
1.50	0.59	1ST	1.70	0.67
1.60	0.63	2ND	1.70	0.67
1.60	0.63	3RD	1.80	0.71
1.70	0.67	5TH	1.90	0.75
1.80	0.71	10TH	2.00	0.79
1.80	0.71	15TH	2.00	0.79
1.90	0.75	20TH	2.10	0.83
1.90	0.75	25TH	2.10	0.83
1.90	0.75	30TH	2.20	0.87
2.00	0.79	35TH	2.20	0.87
2.00	0.79	40TH	2.30	0.91
2.00	0.79	45TH	2.30	0.91
2.10	0.83	50TH	2.30	0.91
2.10	0.83	55TH	2.40	0.94
2.20	0.87	60TH	2.40	0.94
2.20	0.87	65TH	2.40	0.94
2.20	0.87	70TH	2.50	0.98
2.30	0.91	75TH	2.50	0.98
2.30	0.91	80TH	2.60	1.02
2.40	0.94	85TH	2.70	1.06
2.50	0.98	90TH	2.80	1.10
2.70	1.06	95TH	2.90	1.14
2.70	1.06	97TH	2.90	1.14
2.80	1.10	98TH	3.00	1.18
2.90	1.14	99TH	3.10	1.22

(33) EAR PROTRUSION

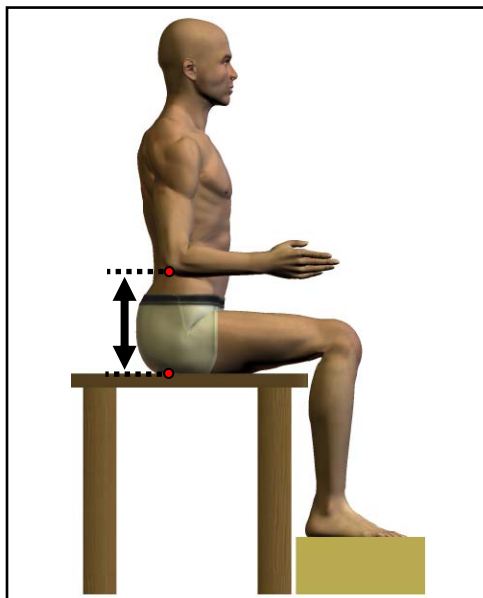
FEMALES		
<u>CM</u>		<u>IN</u>
2.11	MEAN	0.83
0.01	STD ERROR (MEAN)	0.00
0.30	STANDARD DEVIATION	0.12
0.01	STD ERROR (STD DEV)	0.00
1.50	MINIMUM	0.59
3.80	MAXIMUM	1.50
SKEWNESS		0.74
KURTOSIS		4.69
COEFFICIENT OF VARIATION		14.2%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
2.34	MEAN	0.92
0.01	STD ERROR (MEAN)	0.00
0.31	STANDARD DEVIATION	0.12
0.01	STD ERROR (STD DEV)	0.00
1.30	MINIMUM	0.51
3.80	MAXIMUM	1.50
SKEWNESS		0.28
KURTOSIS		3.46
COEFFICIENT OF VARIATION		13.2%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
				1.25	-	1.35		1	0.08	1	0.08
				1.35	-	1.45		2	0.15	3	0.23
				1.45	-	1.55		2	0.15	5	0.38
11	1.77	11	1.77	1.55	-	1.65		7	0.54	12	0.92
13	2.10	24	3.87	1.65	-	1.75		17	1.31	29	2.23
29	4.68	53	8.55	1.75	-	1.85		27	2.08	56	4.30
60	9.68	113	18.23	1.85	-	1.95		66	5.07	122	9.38
87	14.03	200	32.26	1.95	-	2.05		107	8.22	229	17.60
90	14.52	290	46.77	2.05	-	2.15		127	9.76	356	27.36
74	11.94	364	58.71	2.15	-	2.25		146	11.22	502	38.59
77	12.42	441	71.13	2.25	-	2.35		197	15.14	699	53.73
60	9.68	501	80.81	2.35	-	2.45		152	11.68	851	65.41
46	7.42	547	88.23	2.45	-	2.55		136	10.45	987	75.86
28	4.52	575	92.74	2.55	-	2.65		102	7.84	1089	83.70
11	1.77	586	94.52	2.65	-	2.75		75	5.76	1164	89.47
19	3.06	605	97.58	2.75	-	2.85		62	4.77	1226	94.24
7	1.13	612	98.71	2.85	-	2.95		41	3.15	1267	97.39
3	0.48	615	99.19	2.95	-	3.05		12	0.92	1279	98.31
3	0.48	618	99.68	3.05	-	3.15		12	0.92	1291	99.23
0	0.00	618	99.68	3.15	-	3.25		2	0.15	1293	99.39
0	0.00	618	99.68	3.25	-	3.35		5	0.38	1298	99.77
1	0.16	619	99.84	3.35	-	3.45		0	0.00	1298	99.77
0	0.00	619	99.84	3.45	-	3.55		2	0.15	1300	99.92
0	0.00	619	99.84	3.55	-	3.65		0	0.00	1300	99.92
0	0.00	619	99.84	3.65	-	3.75		0	0.00	1300	99.92
0	0.00	619	99.84	3.75	-	3.85		1	0.08	1301	100.00
1	0.16	620	100.00								

(34) ELBOW REST HEIGHT

The vertical distance between a sitting surface and the olecranon, bottom landmark on the flexed right elbow, is measured with an anthropometer. The participant sits erect, looking straight ahead. The shoulders and upper arms are relaxed, and the forearms and hands are extended forward horizontally with the palms facing each other. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
17.20	6.77	1ST	17.90	7.05
17.84	7.03	2ND	18.60	7.32
18.10	7.13	3RD	19.20	7.56
18.80	7.40	5TH	19.80	7.80
19.60	7.72	10TH	20.70	8.15
20.40	8.03	15TH	21.50	8.46
21.20	8.35	20TH	22.00	8.66
21.50	8.46	25TH	22.50	8.86
21.90	8.62	30TH	22.80	8.98
22.30	8.78	35TH	23.20	9.13
22.50	8.86	40TH	23.60	9.29
22.80	8.98	45TH	23.90	9.41
23.20	9.13	50TH	24.30	9.57
23.50	9.25	55TH	24.60	9.69
23.90	9.41	60TH	25.00	9.84
24.20	9.53	65TH	25.30	9.96
24.80	9.76	70TH	25.70	10.12
25.20	9.92	75TH	26.10	10.28
25.50	10.04	80TH	26.70	10.51
26.00	10.24	85TH	27.20	10.71
26.50	10.43	90TH	27.90	10.98
27.20	10.71	95TH	28.99	11.42
27.70	10.91	97TH	29.50	11.61
28.26	11.12	98TH	29.80	11.73
29.20	11.50	99TH	30.60	12.05

(34) ELBOW REST HEIGHT

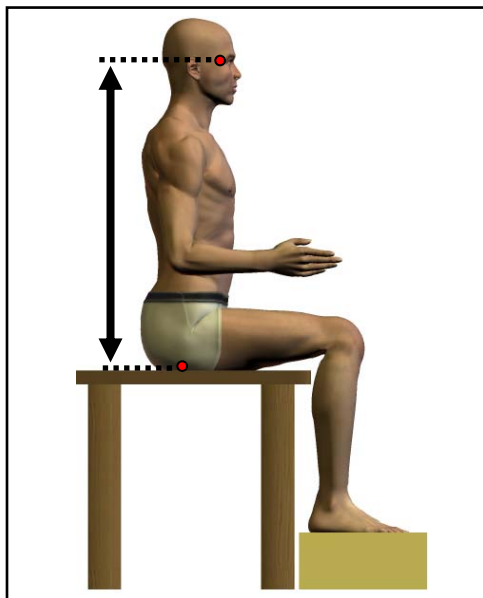
FEMALES		
CM		IN
23.22	MEAN	9.14
0.10	STD ERROR (MEAN)	0.04
2.61	STANDARD DEVIATION	1.03
0.07	STD ERROR (STD DEV)	0.03
16.60	MINIMUM	6.54
32.60	MAXIMUM	12.83
SKEWNESS		0.00
KURTOSIS		2.91
COEFFICIENT OF VARIATION		11.2%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
24.30	MEAN	9.57
0.08	STD ERROR (MEAN)	0.03
2.76	STANDARD DEVIATION	1.09
0.05	STD ERROR (STD DEV)	0.02
15.50	MINIMUM	6.10
35.70	MAXIMUM	14.06
SKEWNESS		0.05
KURTOSIS		3.01
COEFFICIENT OF VARIATION		11.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM		CM		E	FPct	CumF	CumFPct
				15.25	-	15.75		2	0.15	2	0.15
				15.75	-	16.25		0	0.00	2	0.15
2	0.32	2	0.32	16.25	-	16.75		1	0.08	3	0.23
5	0.81	7	1.13	16.75	-	17.25		2	0.15	5	0.38
3	0.48	10	1.61	17.25	-	17.75		5	0.38	10	0.77
11	1.77	21	3.39	17.75	-	18.25		9	0.69	19	1.46
8	1.29	29	4.68	18.25	-	18.75		10	0.77	29	2.23
14	2.26	43	6.94	18.75	-	19.25		12	0.92	41	3.15
27	4.35	70	11.29	19.25	-	19.75		22	1.69	63	4.84
16	2.58	86	13.87	19.75	-	20.25		22	1.69	85	6.53
22	3.55	108	17.42	20.25	-	20.75		50	3.84	135	10.38
23	3.71	131	21.13	20.75	-	21.25		39	3.00	174	13.37
40	6.45	171	27.58	21.25	-	21.75		47	3.61	221	16.99
43	6.94	214	34.52	21.75	-	22.25		68	5.23	289	22.21
57	9.19	271	43.71	22.25	-	22.75		89	6.84	378	29.05
50	8.06	321	51.77	22.75	-	23.25		88	6.76	466	35.82
40	6.45	361	58.23	23.25	-	23.75		94	7.23	560	43.04
43	6.94	404	65.16	23.75	-	24.25		90	6.92	650	49.96
26	4.19	430	69.35	24.25	-	24.75		81	6.23	731	56.19
43	6.94	473	76.29	24.75	-	25.25		100	7.69	831	63.87
37	5.97	510	82.26	25.25	-	25.75		82	6.30	913	70.18
30	4.84	540	87.10	25.75	-	26.25		80	6.15	993	76.33
25	4.03	565	91.13	26.25	-	26.75		54	4.15	1047	80.48
25	4.03	590	95.16	26.75	-	27.25		64	4.92	1111	85.40
13	2.10	603	97.26	27.25	-	27.75		53	4.07	1164	89.47
5	0.81	608	98.06	27.75	-	28.25		29	2.23	1193	91.70
4	0.65	612	98.71	28.25	-	28.75		32	2.46	1225	94.16
4	0.65	616	99.35	28.75	-	29.25		24	1.84	1249	96.00
1	0.16	617	99.52	29.25	-	29.75		24	1.84	1273	97.85
0	0.00	617	99.52	29.75	-	30.25		11	0.85	1284	98.69
0	0.00	617	99.52	30.25	-	30.75		6	0.46	1290	99.15
1	0.16	618	99.68	30.75	-	31.25		4	0.31	1294	99.46
1	0.16	619	99.84	31.25	-	31.75		3	0.23	1297	99.69
0	0.00	619	99.84	31.75	-	32.25		2	0.15	1299	99.85
1	0.16	620	100.00	32.25	-	32.75		1	0.08	1300	99.92
				32.75	-	33.25		0	0.00	1300	99.92
				33.25	-	33.75		0	0.00	1300	99.92
				33.75	-	34.25		0	0.00	1300	99.92
				34.25	-	34.75		0	0.00	1300	99.92
				34.75	-	35.25		0	0.00	1300	99.92
				35.25	-	35.75		1	0.08	1301	100.00

(35) EYE HEIGHT, SITTING

The vertical distance between a sitting surface and the ectocanthus landmark is measured with an anthropometer. The participant sits erect with the head in the Frankfurt plane. The shoulders and upper arms are relaxed, and the forearms and hands are extended forward horizontally with the palms facing each other. The thighs are parallel, and the knees are flexed 90° with the feet in line with the thighs. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
67.46	26.56	1ST	72.80	28.66
68.34	26.91	2ND	73.30	28.86
69.36	27.31	3RD	73.60	28.98
70.01	27.56	5TH	74.61	29.37
71.00	27.95	10TH	75.81	29.84
71.82	28.28	15TH	76.70	30.20
72.40	28.50	20TH	77.40	30.47
72.90	28.70	25TH	77.80	30.63
73.30	28.86	30TH	78.40	30.87
73.70	29.02	35TH	78.80	31.02
74.20	29.21	40TH	79.30	31.22
74.60	29.37	45TH	79.70	31.38
75.00	29.53	50TH	80.15	31.56
75.46	29.71	55TH	80.60	31.73
75.80	29.84	60TH	81.00	31.89
76.10	29.96	65TH	81.50	32.09
76.50	30.12	70TH	82.00	32.28
77.00	30.31	75TH	82.50	32.48
77.60	30.55	80TH	83.10	32.72
78.29	30.82	85TH	83.90	33.03
79.00	31.10	90TH	84.70	33.35
80.30	31.61	95TH	85.90	33.82
80.90	31.85	97TH	86.60	34.09
81.46	32.07	98TH	87.39	34.41
82.28	32.39	99TH	88.50	34.84

(35) EYE HEIGHT, SITTING

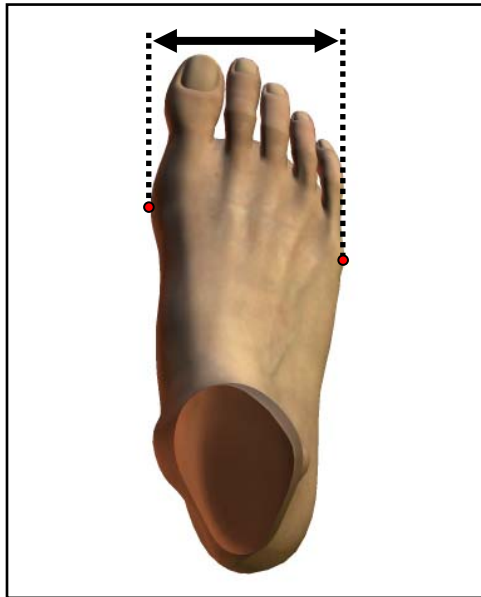
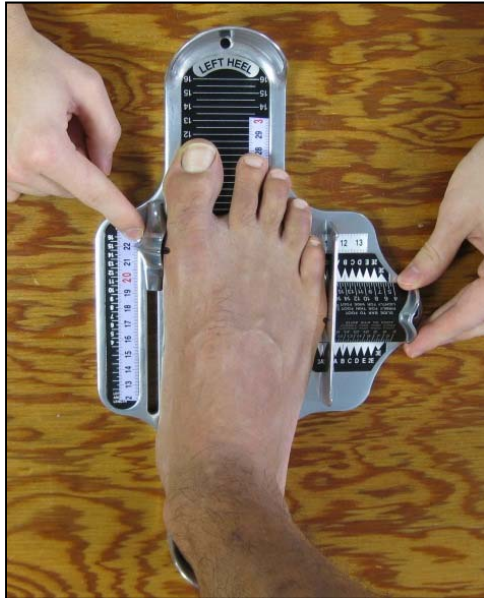
FEMALES		
CM	MEAN	IN
74.99		29.53
0.12	STD ERROR (MEAN)	0.05
3.10	STANDARD DEVIATION	1.22
0.09	STD ERROR (STD DEV)	0.03
65.80	MINIMUM	25.91
84.00	MAXIMUM	33.07
SKEWNESS		0.05
KURTOSIS		2.90
COEFFICIENT OF VARIATION		4.1%
NUMBER OF PARTICIPANTS		620

MALES		
CM	MEAN	IN
80.21		31.58
0.10	STD ERROR (MEAN)	0.04
3.44	STANDARD DEVIATION	1.35
0.07	STD ERROR (STD DEV)	0.03
69.40	MINIMUM	27.32
91.60	MAXIMUM	36.06
SKEWNESS		0.09
KURTOSIS		2.93
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	65.75	-	66.25					
0	0.00	1	0.16	66.25	-	66.75					
2	0.32	3	0.48	66.75	-	67.25					
4	0.65	7	1.13	67.25	-	67.75					
4	0.65	11	1.77	67.75	-	68.25					
2	0.32	13	2.10	68.25	-	68.75					
3	0.48	16	2.58	68.75	-	69.25					
11	1.77	27	4.35	69.25	-	69.75		1	0.08	1	0.08
13	2.10	40	6.45	69.75	-	70.25		0	0.00	1	0.08
9	1.45	49	7.90	70.25	-	70.75		1	0.08	2	0.15
22	3.55	71	11.45	70.75	-	71.25		0	0.00	2	0.15
17	2.74	88	14.19	71.25	-	71.75		5	0.38	7	0.54
27	4.35	115	18.55	71.75	-	72.25		1	0.08	8	0.62
34	5.48	149	24.03	72.25	-	72.75		3	0.23	11	0.85
30	4.84	179	28.87	72.75	-	73.25		14	1.08	25	1.92
46	7.42	225	36.29	73.25	-	73.75		20	1.54	45	3.46
30	4.84	255	41.13	73.75	-	74.25		10	0.77	55	4.23
40	6.45	295	47.58	74.25	-	74.75		16	1.23	71	5.46
36	5.81	331	53.39	74.75	-	75.25		28	2.15	99	7.62
35	5.65	366	59.03	75.25	-	75.75		27	2.08	126	9.69
43	6.94	409	65.97	75.75	-	76.25		26	2.00	152	11.69
44	7.10	453	73.06	76.25	-	76.75		54	4.15	206	15.85
28	4.52	481	77.58	76.75	-	77.25		39	3.00	245	18.85
26	4.19	507	81.77	77.25	-	77.75		68	5.23	313	24.08
20	3.23	527	85.00	77.75	-	78.25		60	4.62	373	28.69
23	3.71	550	88.71	78.25	-	78.75		75	5.77	448	34.46
11	1.77	561	90.48	78.75	-	79.25		71	5.46	519	39.92
16	2.58	577	93.06	79.25	-	79.75		74	5.69	593	45.62
12	1.94	589	95.00	79.75	-	80.25		73	5.62	666	51.23
10	1.61	599	96.61	80.25	-	80.75		69	5.31	735	56.54
7	1.13	606	97.74	80.75	-	81.25		76	5.85	811	62.38
3	0.48	609	98.23	81.25	-	81.75		65	5.00	876	67.38
5	0.81	614	99.03	81.75	-	82.25		71	5.46	947	72.85
3	0.48	617	99.52	82.25	-	82.75		60	4.62	1007	77.46
1	0.16	618	99.68	82.75	-	83.25		45	3.46	1052	80.92
1	0.16	619	99.84	83.25	-	83.75		44	3.38	1096	84.31
1	0.16	620	100.00	83.75	-	84.25		43	3.31	1139	87.62
				84.25	-	84.75		32	2.46	1171	90.08
				84.75	-	85.25		30	2.31	1201	92.38
				85.25	-	85.75		29	2.23	1230	94.62
				85.75	-	86.25		18	1.38	1248	96.00
				86.25	-	86.75		15	1.15	1263	97.15
				86.75	-	87.25		11	0.85	1274	98.00
				87.25	-	87.75		6	0.46	1280	98.46
				87.75	-	88.25		6	0.46	1286	98.92
				88.25	-	88.75		4	0.31	1290	99.23
				88.75	-	89.25		2	0.15	1292	99.38
				89.25	-	89.75		4	0.31	1296	99.69
				89.75	-	90.25		1	0.08	1297	99.77
				90.25	-	90.75		0	0.00	1297	99.77
				90.75	-	91.25		1	0.08	1298	99.85
				91.25	-	91.75		2	0.15	1300	100.00

(36) FOOT BREADTH, HORIZONTAL

The maximum breadth of the right foot is measured with a Brannock device. The participant stands with the right foot on the device and the left foot on a board of equal height with the weight distributed equally on both feet. The heel of the right foot lightly touches the back of the device, and the medial side of the right foot is parallel with the long axis of the device. The vertical slide of the device is moved until it lightly touches the fifth metatarsophalangeal protrusion landmark.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
8.10	3.19	1ST	9.00	3.54
8.20	3.23	2ND	9.10	3.58
8.30	3.27	3RD	9.20	3.62
8.40	3.31	5TH	9.30	3.66
8.50	3.35	10TH	9.50	3.74
8.60	3.39	15TH	9.60	3.78
8.70	3.43	20TH	9.70	3.82
8.80	3.46	25TH	9.80	3.86
8.90	3.50	30TH	9.90	3.90
8.90	3.50	35TH	9.90	3.90
9.00	3.54	40TH	10.00	3.94
9.00	3.54	45TH	10.00	3.94
9.10	3.58	50TH	10.10	3.98
9.10	3.58	55TH	10.10	3.98
9.20	3.62	60TH	10.20	4.02
9.30	3.66	65TH	10.30	4.06
9.30	3.66	70TH	10.30	4.06
9.40	3.70	75TH	10.40	4.09
9.50	3.74	80TH	10.50	4.13
9.60	3.78	85TH	10.70	4.21
9.70	3.82	90TH	10.80	4.25
9.90	3.90	95TH	11.00	4.33
10.00	3.94	97TH	11.20	4.41
10.10	3.98	98TH	11.40	4.49
10.20	4.02	99TH	11.50	4.53

(36) FOOT BREADTH, HORIZONTAL

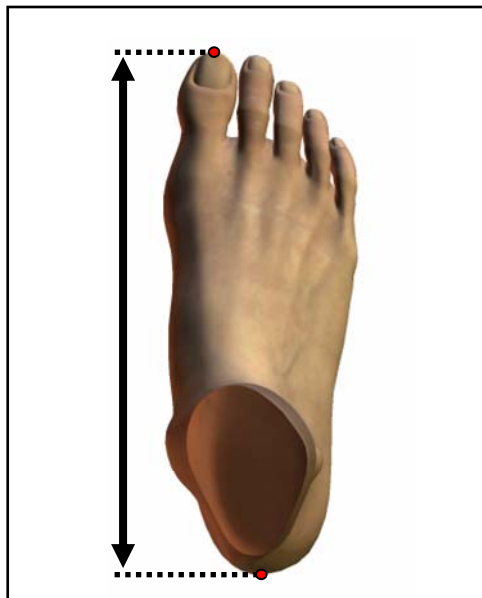
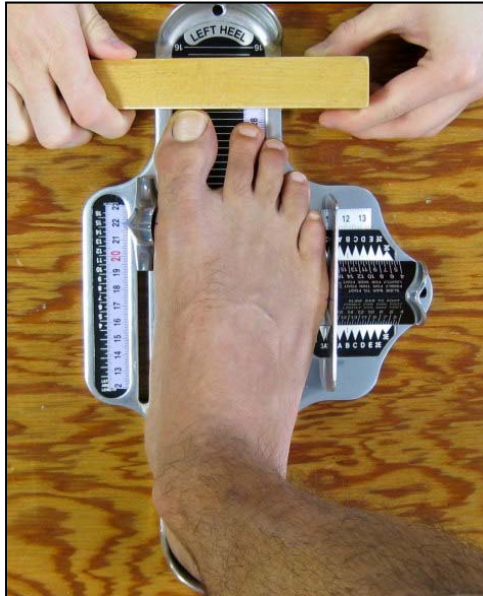
FEMALES		
CM		IN
9.11	MEAN	3.58
0.02	STD ERROR (MEAN)	0.01
0.45	STANDARD DEVIATION	0.18
0.01	STD ERROR (STD DEV)	0.01
7.80	MINIMUM	3.07
10.50	MAXIMUM	4.13
SKEWNESS		0.14
KURTOSIS		2.96
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
10.12	MEAN	3.98
0.01	STD ERROR (MEAN)	0.01
0.53	STANDARD DEVIATION	0.21
0.01	STD ERROR (STD DEV)	0.00
8.50	MINIMUM	3.35
12.20	MAXIMUM	4.80
SKEWNESS		0.32
KURTOSIS		3.37
COEFFICIENT OF VARIATION		5.2%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	7.75	-	7.85					
2	0.32	3	0.48	7.85	-	7.95					
1	0.16	4	0.65	7.95	-	8.05					
4	0.65	8	1.29	8.05	-	8.15					
7	1.13	15	2.42	8.15	-	8.25					
10	1.61	25	4.03	8.25	-	8.35					
17	2.74	42	6.77	8.35	-	8.45					
22	3.55	64	10.32	8.45	-	8.55		1	0.08	1	0.08
30	4.84	94	15.16	8.55	-	8.65		1	0.08	2	0.15
40	6.45	134	21.61	8.65	-	8.75		3	0.23	5	0.38
40	6.45	174	28.06	8.75	-	8.85		1	0.08	6	0.46
62	10.00	236	38.06	8.85	-	8.95		5	0.38	11	0.85
61	9.84	297	47.90	8.95	-	9.05		11	0.85	22	1.69
49	7.90	346	55.81	9.05	-	9.15		12	0.92	34	2.62
43	6.94	389	62.74	9.15	-	9.25		20	1.54	54	4.15
48	7.74	437	70.48	9.25	-	9.35		21	1.62	75	5.77
40	6.45	477	76.94	9.35	-	9.45		46	3.54	121	9.31
42	6.77	519	83.71	9.45	-	9.55		58	4.46	179	13.77
37	5.97	556	89.68	9.55	-	9.65		49	3.77	228	17.54
16	2.58	572	92.26	9.65	-	9.75		84	6.46	312	24.00
15	2.42	587	94.68	9.75	-	9.85		70	5.38	382	29.38
9	1.45	596	96.13	9.85	-	9.95		112	8.62	494	38.00
8	1.29	604	97.42	9.95	-	10.05		125	9.62	619	47.62
8	1.29	612	98.71	10.05	-	10.15		108	8.31	727	55.92
4	0.65	616	99.35	10.15	-	10.25		92	7.08	819	63.00
1	0.16	617	99.52	10.25	-	10.35		96	7.38	915	70.38
2	0.32	619	99.84	10.35	-	10.45		70	5.38	985	75.77
1	0.16	620	100.00	10.45	-	10.55		73	5.62	1058	81.38
				10.55	-	10.65		36	2.77	1094	84.15
				10.65	-	10.75		57	4.38	1151	88.54
				10.75	-	10.85		35	2.69	1186	91.23
				10.85	-	10.95		28	2.15	1214	93.38
				10.95	-	11.05		26	2.00	1240	95.38
				11.05	-	11.15		10	0.77	1250	96.15
				11.15	-	11.25		15	1.15	1265	97.31
				11.25	-	11.35		9	0.69	1274	98.00
				11.35	-	11.45		12	0.92	1286	98.92
				11.45	-	11.55		4	0.31	1290	99.23
				11.55	-	11.65		5	0.38	1295	99.62
				11.65	-	11.75		1	0.08	1296	99.69
				11.75	-	11.85		2	0.15	1298	99.85
				11.85	-	11.95		0	0.00	1298	99.85
				11.95	-	12.05		1	0.08	1299	99.92
				12.05	-	12.15		0	0.00	1299	99.92
				12.15	-	12.25		1	0.08	1300	100.00

(37) FOOT LENGTH

The maximum length of the right foot is measured with a Brannock device. The participant stands with the right foot on the device and the left foot on a board of equal height with the weight distributed equally on both feet. The heel of the right foot lightly touches the back of the device, and the medial side of the right foot is parallel with the long axis of the device. A block is placed against the tip of the longest toe to establish the measurement on the scale of the device.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
21.84	8.60	1ST	24.50	9.65
22.10	8.70	2ND	24.60	9.69
22.30	8.78	3RD	24.70	9.72
22.70	8.94	5TH	25.10	9.88
23.10	9.09	10TH	25.41	10.00
23.30	9.17	15TH	25.70	10.12
23.42	9.22	20TH	26.00	10.24
23.60	9.29	25TH	26.20	10.31
23.80	9.37	30TH	26.33	10.36
23.94	9.42	35TH	26.50	10.43
24.10	9.49	40TH	26.70	10.51
24.30	9.57	45TH	26.90	10.59
24.40	9.61	50TH	27.10	10.67
24.50	9.65	55TH	27.30	10.75
24.70	9.72	60TH	27.40	10.79
24.80	9.76	65TH	27.60	10.87
25.00	9.84	70TH	27.80	10.94
25.30	9.96	75TH	28.00	11.02
25.40	10.00	80TH	28.20	11.10
25.60	10.08	85TH	28.50	11.22
25.99	10.24	90TH	28.80	11.34
26.50	10.43	95TH	29.30	11.54
26.74	10.52	97TH	29.50	11.61
27.20	10.71	98TH	29.80	11.73
27.48	10.82	99TH	30.20	11.89

(37) FOOT LENGTH

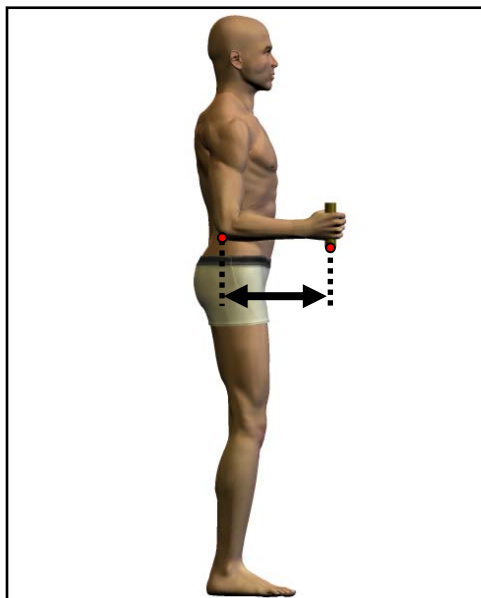
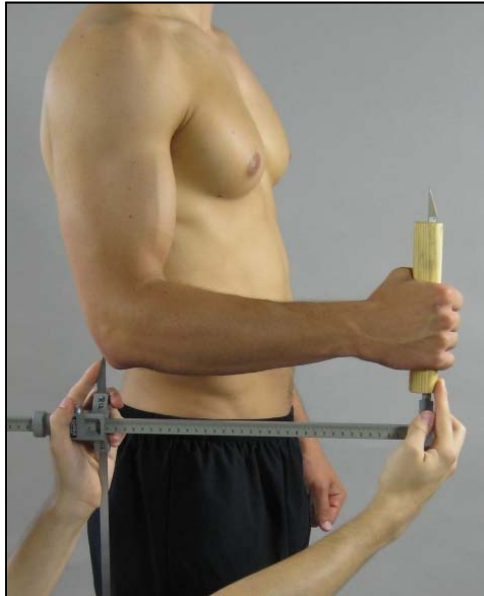
FEMALES		
CM		IN
24.44	MEAN	9.62
0.05	STD ERROR (MEAN)	0.02
1.19	STANDARD DEVIATION	0.47
0.03	STD ERROR (STD DEV)	0.01
20.60	MINIMUM	8.11
29.50	MAXIMUM	11.61
SKEWNESS		0.30
KURTOSIS		3.69
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
27.10	MEAN	10.67
0.04	STD ERROR (MEAN)	0.01
1.28	STANDARD DEVIATION	0.51
0.03	STD ERROR (STD DEV)	0.01
23.50	MINIMUM	9.25
31.10	MAXIMUM	12.32
SKEWNESS		0.17
KURTOSIS		2.69
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
2	0.32	2	0.32	20.60	-	20.85					
0	0.00	2	0.32	20.85	-	21.10					
2	0.32	4	0.65	21.10	-	21.35					
0	0.00	4	0.65	21.35	-	21.60					
2	0.32	6	0.97	21.60	-	21.85					
2	0.32	8	1.29	21.85	-	22.10					
11	1.77	19	3.06	22.10	-	22.35					
6	0.97	25	4.03	22.35	-	22.60					
16	2.58	41	6.61	22.60	-	22.85					
20	3.23	61	9.84	22.85	-	23.10					
45	7.26	106	17.10	23.10	-	23.35					
41	6.61	147	23.71	23.35	-	23.60		1	0.08	1	0.08
52	8.39	199	32.10	23.60	-	23.85		0	0.00	1	0.08
43	6.94	242	39.03	23.85	-	24.10		3	0.23	4	0.31
61	9.84	303	48.87	24.10	-	24.35		4	0.31	8	0.62
42	6.77	345	55.65	24.35	-	24.60		8	0.62	16	1.23
65	10.48	410	66.13	24.60	-	24.85		29	2.23	45	3.46
32	5.16	442	71.29	24.85	-	25.10		12	0.92	57	4.38
42	6.77	484	78.06	25.10	-	25.35		52	4.00	109	8.38
32	5.16	516	83.23	25.35	-	25.60		52	4.00	161	12.38
35	5.65	551	88.87	25.60	-	25.85		61	4.69	222	17.08
11	1.77	562	90.65	25.85	-	26.10		73	5.62	295	22.69
25	4.03	587	94.68	26.10	-	26.35		95	7.31	390	30.00
8	1.29	595	95.97	26.35	-	26.60		79	6.08	469	36.08
8	1.29	603	97.26	26.60	-	26.85		112	8.62	581	44.69
2	0.32	605	97.58	26.85	-	27.10		67	5.15	648	49.85
7	1.13	612	98.71	27.10	-	27.35		108	8.31	756	58.15
4	0.65	616	99.35	27.35	-	27.60		78	6.00	834	64.15
1	0.16	617	99.52	27.60	-	27.85		101	7.77	935	71.92
0	0.00	617	99.52	27.85	-	28.10		62	4.77	997	76.69
0	0.00	617	99.52	28.10	-	28.35		75	5.77	1072	82.46
2	0.32	619	99.84	28.35	-	28.60		50	3.85	1122	86.31
0	0.00	619	99.84	28.60	-	28.85		64	4.92	1186	91.23
0	0.00	619	99.84	28.85	-	29.10		25	1.92	1211	93.15
0	0.00	619	99.84	29.10	-	29.35		32	2.46	1243	95.62
1	0.16	620	100.00	29.35	-	29.60		22	1.69	1265	97.31
				29.60	-	29.85		12	0.92	1277	98.23
				29.85	-	30.10		9	0.69	1286	98.92
				30.10	-	30.35		6	0.46	1292	99.38
				30.35	-	30.60		2	0.15	1294	99.54
				30.60	-	30.85		3	0.23	1297	99.77
				30.85	-	31.10		1	0.08	1298	99.85
				31.10	-	31.35		2	0.15	1300	100.00

(38) FOREARM-CENTER OF GRIP LENGTH

The horizontal distance between the olecranon rear landmark and the center of a 1-1/4"-diameter dowel gripped in the right hand is measured with a beam caliper. The participant stands erect with the upper arms hanging at the side and the right elbow flexed 90°. The hand grips a 1-1/4"-diameter dowel placed on the fixed blade of a beam caliper. The hand gripping the dowel should be in line with the long axis of the arm. The dowel should remain vertical.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
28.70	11.30	1ST	31.10	12.24
28.84	11.36	2ND	31.50	12.40
29.00	11.42	3RD	31.91	12.56
29.20	11.50	5TH	32.30	12.72
29.70	11.69	10TH	32.90	12.95
30.00	11.81	15TH	33.30	13.11
30.30	11.93	20TH	33.50	13.19
30.60	12.05	25TH	33.80	13.31
30.80	12.13	30TH	34.00	13.39
31.10	12.24	35TH	34.20	13.46
31.40	12.36	40TH	34.50	13.58
31.50	12.40	45TH	34.70	13.66
31.70	12.48	50TH	35.00	13.78
32.00	12.60	55TH	35.20	13.86
32.10	12.64	60TH	35.40	13.94
32.40	12.76	65TH	35.60	14.02
32.60	12.83	70TH	35.90	14.13
32.90	12.95	75TH	36.10	14.21
33.20	13.07	80TH	36.50	14.37
33.60	13.23	85TH	36.90	14.53
34.00	13.39	90TH	37.30	14.69
34.50	13.58	95TH	38.10	15.00
35.00	13.78	97TH	38.49	15.16
35.20	13.86	98TH	38.80	15.28
35.94	14.15	99TH	39.20	15.43

(38) FOREARM-CENTER OF GRIP LENGTH

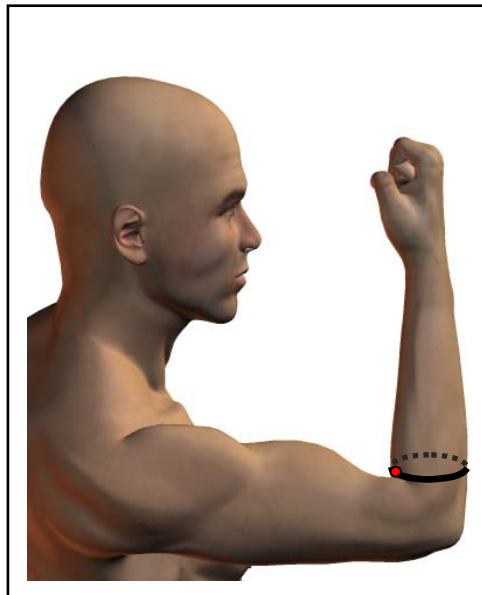
FEMALES		
<u>CM</u>		<u>IN</u>
31.79	MEAN	12.52
0.07	STD ERROR (MEAN)	0.03
1.63	STANDARD DEVIATION	0.64
0.05	STD ERROR (STD DEV)	0.02
27.80	MINIMUM	10.94
36.80	MAXIMUM	14.49
SKEWNESS		0.24
KURTOSIS		2.72
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		619

MALES		
<u>CM</u>		<u>IN</u>
35.02	MEAN	13.79
0.05	STD ERROR (MEAN)	0.02
1.75	STANDARD DEVIATION	0.69
0.03	STD ERROR (STD DEV)	0.01
28.90	MINIMUM	11.38
41.10	MAXIMUM	16.18
SKEWNESS		0.18
KURTOSIS		2.99
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
3	0.48	3	0.48	27.75	-	28.25					
5	0.81	8	1.29	28.25	-	28.75					
23	3.72	31	5.01	28.75	-	29.25	1	0.08	1	0.08	
33	5.33	64	10.34	29.25	-	29.75	1	0.08	2	0.15	
53	8.56	117	18.90	29.75	-	30.25	0	0.00	2	0.15	
62	10.02	179	28.92	30.25	-	30.75	2	0.15	4	0.31	
54	8.72	233	37.64	30.75	-	31.25	13	1.00	17	1.31	
78	12.60	311	50.24	31.25	-	31.75	17	1.31	34	2.61	
75	12.12	386	62.36	31.75	-	32.25	27	2.08	61	4.69	
63	10.18	449	72.54	32.25	-	32.75	48	3.69	109	8.38	
48	7.75	497	80.29	32.75	-	33.25	73	5.61	182	13.99	
42	6.79	539	87.08	33.25	-	33.75	138	10.61	320	24.60	
35	5.65	574	92.73	33.75	-	34.25	139	10.68	459	35.28	
20	3.23	594	95.96	34.25	-	34.75	142	10.91	601	46.20	
14	2.26	608	98.22	34.75	-	35.25	136	10.45	737	56.65	
5	0.81	613	99.03	35.25	-	35.75	139	10.68	876	67.33	
1	0.16	614	99.19	35.75	-	36.25	124	9.53	1000	76.86	
4	0.65	618	99.84	36.25	-	36.75	84	6.46	1084	83.32	
1	0.16	619	100.00	36.75	-	37.25	77	5.92	1161	89.24	
				37.25	-	37.75	54	4.15	1215	93.39	
				37.75	-	38.25	33	2.54	1248	95.93	
				38.25	-	38.75	25	1.92	1273	97.85	
				38.75	-	39.25	16	1.23	1289	99.08	
				39.25	-	39.75	6	0.46	1295	99.54	
				39.75	-	40.25	4	0.31	1299	99.85	
				40.25	-	40.75	1	0.08	1300	99.92	
				40.75	-	41.25	1	0.08	1301	100.00	

(39) FOREARM CIRCUMFERENCE, FLEXED

The circumference of the flexed right forearm is measured with a tape passing across the crease at the juncture between the upper arm and the forearm. The measurement is made in a plane perpendicular to the long axis of the forearm. The participant stands with the upper arm extended forward horizontally, the elbow flexed 90°, and the fist tightly clenched with palm facing the head.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
22.90	9.02	1ST	26.20	10.31
23.20	9.13	2ND	26.70	10.51
23.30	9.17	3RD	27.00	10.63
23.70	9.33	5TH	27.50	10.83
24.10	9.49	10TH	28.20	11.10
24.40	9.61	15TH	28.70	11.30
24.70	9.72	20TH	29.00	11.42
25.00	9.84	25TH	29.30	11.54
25.10	9.88	30TH	29.60	11.65
25.40	10.00	35TH	29.80	11.73
25.60	10.08	40TH	30.10	11.85
25.80	10.16	45TH	30.40	11.97
26.00	10.24	50TH	30.60	12.05
26.10	10.28	55TH	30.90	12.17
26.30	10.35	60TH	31.20	12.28
26.57	10.46	65TH	31.50	12.40
26.80	10.55	70TH	31.80	12.52
27.00	10.63	75TH	32.10	12.64
27.30	10.75	80TH	32.46	12.78
27.50	10.83	85TH	32.90	12.95
27.90	10.98	90TH	33.40	13.15
28.30	11.14	95TH	34.10	13.43
28.64	11.27	97TH	34.69	13.66
28.90	11.38	98TH	35.30	13.90
29.48	11.60	99TH	35.90	14.13

(39) FOREARM CIRCUMFERENCE, FLEXED

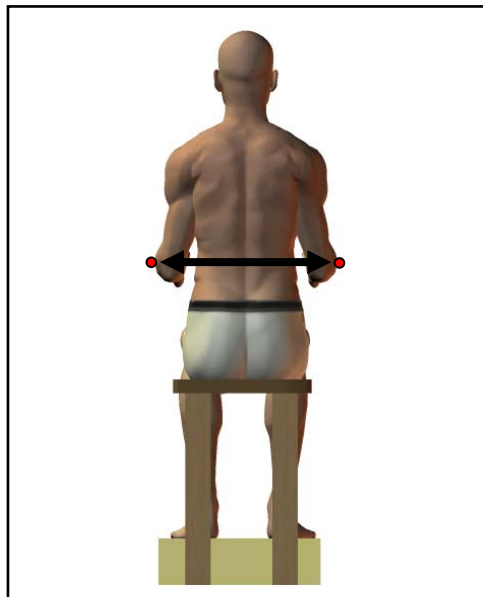
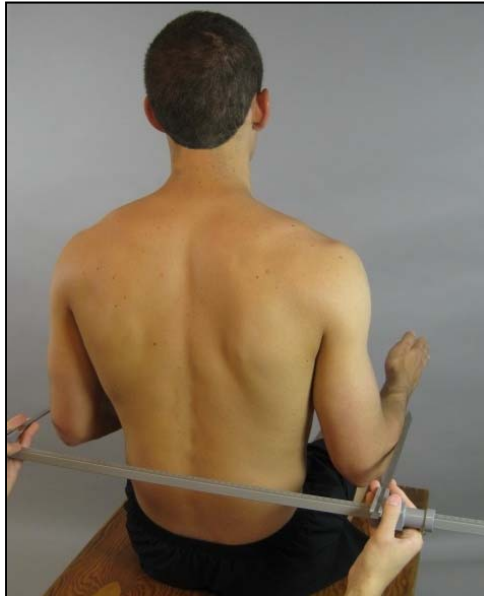
FEMALES		
CM		IN
25.99	MEAN	10.23
0.06	STD ERROR (MEAN)	0.02
1.45	STANDARD DEVIATION	0.57
0.04	STD ERROR (STD DEV)	0.02
22.70	MINIMUM	8.94
33.40	MAXIMUM	13.15
SKEWNESS		0.28
KURTOSIS		3.54
COEFFICIENT OF VARIATION		5.6%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
30.73	MEAN	12.10
0.06	STD ERROR (MEAN)	0.02
2.04	STANDARD DEVIATION	0.80
0.04	STD ERROR (STD DEV)	0.02
25.10	MINIMUM	9.88
38.00	MAXIMUM	14.96
SKEWNESS		0.23
KURTOSIS		3.01
COEFFICIENT OF VARIATION		6.6%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
2	0.32	2	0.32	22.25	-	22.75					
15	2.42	17	2.74	22.75	-	23.25					
17	2.74	34	5.48	23.25	-	23.75					
41	6.61	75	12.10	23.75	-	24.25					
59	9.52	134	21.61	24.25	-	24.75					
65	10.48	199	32.10	24.75	-	25.25		1	0.08	1	0.08
72	11.61	271	43.71	25.25	-	25.75		2	0.15	3	0.23
89	14.35	360	58.06	25.75	-	26.25		13	1.00	16	1.23
72	11.61	432	69.68	26.25	-	26.75		15	1.15	31	2.38
62	10.00	494	79.68	26.75	-	27.25		14	1.08	45	3.46
54	8.71	548	88.39	27.25	-	27.75		41	3.15	86	6.61
38	6.13	586	94.52	27.75	-	28.25		46	3.54	132	10.15
17	2.74	603	97.26	28.25	-	28.75		74	5.69	206	15.83
9	1.45	612	98.71	28.75	-	29.25		112	8.61	318	24.44
3	0.48	615	99.19	29.25	-	29.75		121	9.30	439	33.74
3	0.48	618	99.68	29.75	-	30.25		122	9.38	561	43.12
1	0.16	619	99.84	30.25	-	30.75		120	9.22	681	52.34
0	0.00	619	99.84	30.75	-	31.25		123	9.45	804	61.80
0	0.00	619	99.84	31.25	-	31.75		106	8.15	910	69.95
0	0.00	619	99.84	31.75	-	32.25		96	7.38	1006	77.33
0	0.00	619	99.84	32.25	-	32.75		85	6.53	1091	83.86
0	0.00	619	99.84	32.75	-	33.25		62	4.77	1153	88.62
1	0.16	620	100.00	33.25	-	33.75		55	4.23	1208	92.85
				33.75	-	34.25		36	2.77	1244	95.62
				34.25	-	34.75		20	1.54	1264	97.16
				34.75	-	35.25		11	0.85	1275	98.00
				35.25	-	35.75		11	0.85	1286	98.85
				35.75	-	36.25		8	0.61	1294	99.46
				36.25	-	36.75		3	0.23	1297	99.69
				36.75	-	37.25		2	0.15	1299	99.85
				37.25	-	37.75		0	0.00	1299	99.85
				37.75	-	38.25		2	0.15	1301	100.00

(40) FOREARM-FOREARM BREADTH

The maximum horizontal distance across the upper body between the outer sides of the forearms is measured with a beam caliper. The participant sits erect, looking straight ahead. The shoulders and upper arms are relaxed, and the forearms and hands are extended forward horizontally with the palms facing each other. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
41.04	16.16	1ST	45.20	17.80
41.78	16.45	2ND	46.30	18.23
42.30	16.65	3RD	47.10	18.54
42.81	16.85	5TH	48.20	18.98
43.91	17.28	10TH	49.70	19.57
44.60	17.56	15TH	50.70	19.96
45.32	17.84	20TH	51.70	20.35
45.90	18.07	25TH	52.30	20.59
46.40	18.27	30TH	53.00	20.87
46.80	18.43	35TH	53.70	21.14
47.20	18.58	40TH	54.30	21.38
47.60	18.74	45TH	54.90	21.61
48.00	18.90	50TH	55.60	21.89
48.60	19.13	55TH	56.10	22.09
48.90	19.25	60TH	56.70	22.32
49.40	19.45	65TH	57.43	22.61
49.90	19.65	70TH	58.10	22.87
50.50	19.88	75TH	58.70	23.11
50.80	20.00	80TH	59.46	23.41
51.50	20.28	85TH	60.30	23.74
52.50	20.67	90TH	61.70	24.29
53.50	21.06	95TH	63.30	24.92
55.00	21.65	97TH	64.79	25.51
56.00	22.05	98TH	65.90	25.94
57.13	22.49	99TH	67.09	26.42

(40) FOREARM-FOREARM BREADTH

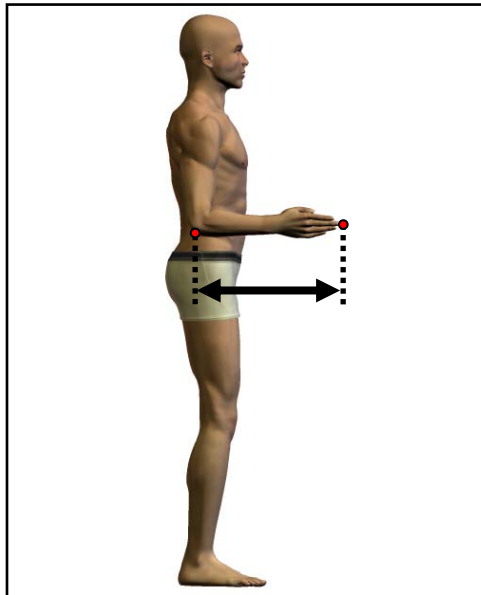
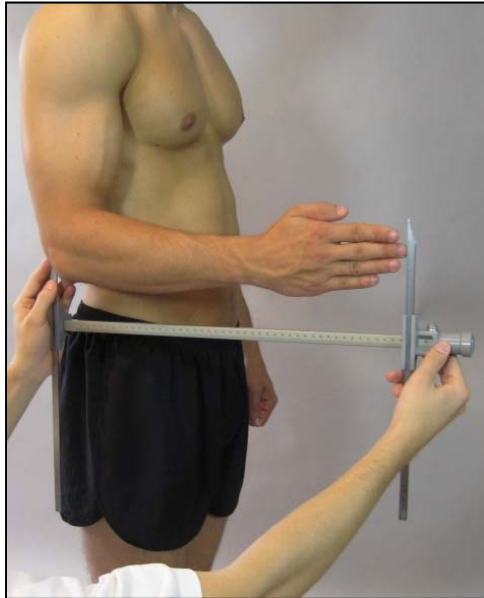
FEMALES		
CM		IN
48.20	MEAN	18.98
0.13	STD ERROR (MEAN)	0.05
3.35	STANDARD DEVIATION	1.32
0.10	STD ERROR (STD DEV)	0.04
40.10	MINIMUM	15.79
62.50	MAXIMUM	24.61
SKEWNESS		0.34
KURTOSIS		3.42
COEFFICIENT OF VARIATION		7.0%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
55.61	MEAN	21.89
0.13	STD ERROR (MEAN)	0.05
4.64	STANDARD DEVIATION	1.83
0.09	STD ERROR (STD DEV)	0.04
43.50	MINIMUM	17.13
70.40	MAXIMUM	27.72
SKEWNESS		0.13
KURTOSIS		2.83
COEFFICIENT OF VARIATION		8.3%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
3	0.48	3	0.48	39.55	-	40.55					
6	0.97	9	1.45	40.55	-	41.55					
16	2.58	25	4.03	41.55	-	42.55					
24	3.87	49	7.90	42.55	-	43.55		1	0.08	1	0.08
39	6.29	88	14.19	43.55	-	44.55		4	0.31	5	0.38
47	7.58	135	21.77	44.55	-	45.55		11	0.85	16	1.23
60	9.68	195	31.45	45.55	-	46.55		13	1.00	29	2.23
81	13.06	276	44.52	46.55	-	47.55		18	1.38	47	3.61
58	9.35	334	53.87	47.55	-	48.55		31	2.38	78	6.00
75	12.10	409	65.97	48.55	-	49.55		44	3.38	122	9.38
62	10.00	471	75.97	49.55	-	50.55		63	4.84	185	14.22
57	9.19	528	85.16	50.55	-	51.55		62	4.77	247	18.99
34	5.48	562	90.65	51.55	-	52.55		106	8.15	353	27.13
29	4.68	591	95.32	52.55	-	53.55		84	6.46	437	33.59
5	0.81	596	96.13	53.55	-	54.55		109	8.38	546	41.97
8	1.29	604	97.42	54.55	-	55.55		103	7.92	649	49.88
10	1.61	614	99.03	55.55	-	56.55		114	8.76	763	58.65
3	0.48	617	99.52	56.55	-	57.55		94	7.23	857	65.87
0	0.00	617	99.52	57.55	-	58.55		103	7.92	960	73.79
1	0.16	618	99.68	58.55	-	59.55		91	6.99	1051	80.78
1	0.16	619	99.84	59.55	-	60.55		67	5.15	1118	85.93
0	0.00	619	99.84	60.55	-	61.55		48	3.69	1166	89.62
1	0.16	620	100.00	61.55	-	62.55		44	3.38	1210	93.01
				62.55	-	63.55		31	2.38	1241	95.39
				63.55	-	64.55		18	1.38	1259	96.77
				64.55	-	65.55		12	0.92	1271	97.69
				65.55	-	66.55		14	1.08	1285	98.77
				66.55	-	67.55		5	0.38	1290	99.15
				67.55	-	68.55		10	0.77	1300	99.92
				68.55	-	69.55		0	0.00	1300	99.92
				69.55	-	70.55		1	0.08	1301	100.00

(41) FOREARM-HAND LENGTH

The horizontal distance between the olecranon rear landmark and the dactylion III landmark is measured with a beam caliper. The participant stands erect with the upper arms hanging at the sides and the right elbow flexed 90°. The hand is held out straight with the palm facing inward.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
39.32	15.48	1ST	42.70	16.81
39.54	15.57	2ND	43.30	17.05
39.80	15.67	3RD	43.71	17.20
40.21	15.83	5TH	44.20	17.40
40.80	16.06	10TH	44.90	17.68
41.20	16.22	15TH	45.30	17.83
41.50	16.34	20TH	45.70	17.99
41.70	16.42	25TH	46.00	18.11
42.10	16.57	30TH	46.36	18.25
42.30	16.65	35TH	46.70	18.39
42.70	16.81	40TH	47.00	18.50
43.00	16.93	45TH	47.30	18.62
43.30	17.05	50TH	47.50	18.70
43.50	17.13	55TH	47.90	18.86
43.80	17.24	60TH	48.20	18.98
44.10	17.36	65TH	48.50	19.09
44.40	17.48	70TH	48.80	19.21
44.70	17.60	75TH	49.20	19.37
45.08	17.75	80TH	49.70	19.57
45.60	17.95	85TH	50.10	19.72
46.20	18.19	90TH	50.70	19.96
47.00	18.50	95TH	51.80	20.39
47.54	18.71	97TH	52.40	20.63
47.86	18.84	98TH	52.80	20.79
48.60	19.13	99TH	53.10	20.91

(41) FOREARM-HAND LENGTH

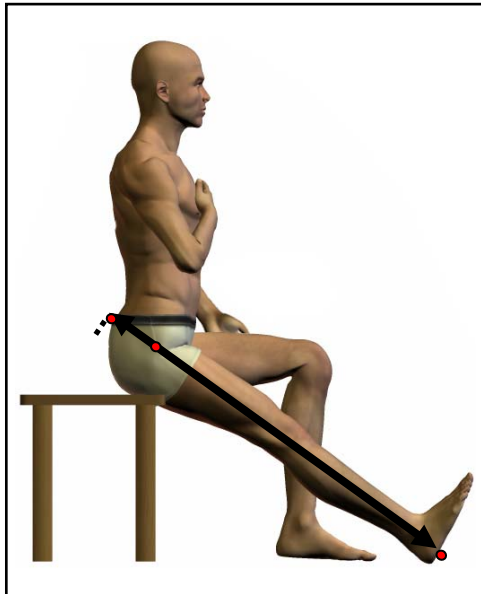
FEMALES		
CM		IN
43.36	MEAN	17.07
0.08	STD ERROR (MEAN)	0.03
2.08	STANDARD DEVIATION	0.82
0.06	STD ERROR (STD DEV)	0.02
37.40	MINIMUM	14.72
50.00	MAXIMUM	19.69
SKEWNESS		0.33
KURTOSIS		2.87
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
47.69	MEAN	18.78
0.06	STD ERROR (MEAN)	0.02
2.29	STANDARD DEVIATION	0.90
0.04	STD ERROR (STD DEV)	0.02
40.10	MINIMUM	15.79
56.60	MAXIMUM	22.28
SKEWNESS		0.24
KURTOSIS		2.96
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	37.25	-	37.75					
0	0.00	1	0.16	37.75	-	38.25					
0	0.00	1	0.16	38.25	-	38.75					
4	0.65	5	0.81	38.75	-	39.25					
10	1.61	15	2.42	39.25	-	39.75					
16	2.58	31	5.00	39.75	-	40.25		1	0.08	1	0.08
27	4.35	58	9.35	40.25	-	40.75		0	0.00	1	0.08
43	6.94	101	16.29	40.75	-	41.25		1	0.08	2	0.15
56	9.03	157	25.32	41.25	-	41.75		2	0.15	4	0.31
48	7.74	205	33.06	41.75	-	42.25		2	0.15	6	0.46
48	7.74	253	40.81	42.25	-	42.75		8	0.61	14	1.08
54	8.71	307	49.52	42.75	-	43.25		10	0.77	24	1.84
60	9.68	367	59.19	43.25	-	43.75		15	1.15	39	3.00
57	9.19	424	68.39	43.75	-	44.25		29	2.23	68	5.23
44	7.10	468	75.48	44.25	-	44.75		41	3.15	109	8.38
37	5.97	505	81.45	44.75	-	45.25		73	5.61	182	13.99
34	5.48	539	86.94	45.25	-	45.75		92	7.07	274	21.06
23	3.71	562	90.65	45.75	-	46.25		93	7.15	367	28.21
21	3.39	583	94.03	46.25	-	46.75		107	8.22	474	36.43
13	2.10	596	96.13	46.75	-	47.25		102	7.84	576	44.27
9	1.45	605	97.58	47.25	-	47.75		113	8.69	689	52.96
6	0.97	611	98.55	47.75	-	48.25		105	8.07	794	61.03
5	0.81	616	99.35	48.25	-	48.75		100	7.69	894	68.72
0	0.00	616	99.35	48.75	-	49.25		87	6.69	981	75.40
2	0.32	618	99.68	49.25	-	49.75		75	5.76	1056	81.17
2	0.32	620	100.00	49.75	-	50.25		68	5.23	1124	86.40
				50.25	-	50.75		54	4.15	1178	90.55
				50.75	-	51.25		37	2.84	1215	93.39
				51.25	-	51.75		18	1.38	1233	94.77
				51.75	-	52.25		25	1.92	1258	96.69
				52.25	-	52.75		15	1.15	1273	97.85
				52.75	-	53.25		17	1.31	1290	99.15
				53.25	-	53.75		4	0.31	1294	99.46
				53.75	-	54.25		4	0.31	1298	99.77
				54.25	-	54.75		2	0.15	1300	99.92
				54.75	-	55.25		0	0.00	1300	99.92
				55.25	-	55.75		0	0.00	1300	99.92
				55.75	-	56.25		0	0.00	1300	99.92
				56.25	-	56.75		1	0.08	1301	100.00

(42) FUNCTIONAL LEG LENGTH

The straight-line distance between the plane of the bottom of the right foot with the leg extended and the back of the body of a seated participant is measured with an anthropometer passing over the trochanter landmark. The participant sits erect on a stool 45.8 cm high. The right leg is extended, and the foot is on the base plate of the anthropometer, which rests on the floor. The measurement is made from the footrest surface of the base plate.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
95.04	37.42	1ST	101.90	40.12
96.47	37.98	2ND	102.80	40.47
97.00	38.19	3RD	103.21	40.63
98.00	38.58	5TH	104.31	41.06
99.40	39.13	10TH	106.22	41.82
100.30	39.49	15TH	107.40	42.28
101.30	39.88	20TH	108.94	42.89
102.10	40.20	25TH	109.70	43.19
102.80	40.47	30TH	110.50	43.50
103.30	40.67	35TH	111.00	43.70
103.90	40.91	40TH	111.70	43.98
104.61	41.18	45TH	112.50	44.29
105.30	41.46	50TH	113.10	44.53
105.70	41.61	55TH	113.70	44.76
106.30	41.85	60TH	114.50	45.08
107.20	42.20	65TH	115.50	45.47
108.00	42.52	70TH	116.30	45.79
108.70	42.80	75TH	117.10	46.10
109.60	43.15	80TH	118.00	46.46
110.73	43.59	85TH	119.50	47.05
112.00	44.09	90TH	120.80	47.56
113.61	44.72	95TH	123.00	48.43
114.69	45.16	97TH	124.50	49.02
115.60	45.51	98TH	125.40	49.37
117.08	46.09	99TH	127.10	50.04

(42) FUNCTIONAL LEG LENGTH

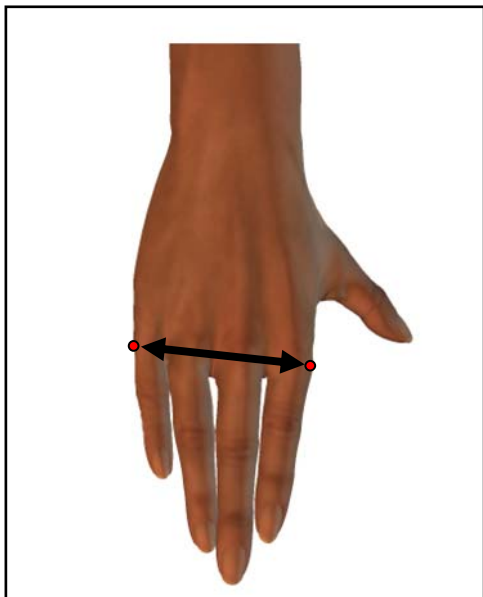
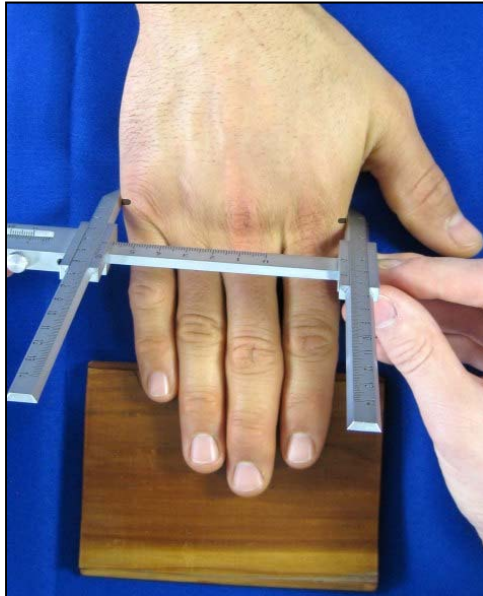
FEMALES		
CM		IN
105.47	MEAN	41.52
0.19	STD ERROR (MEAN)	0.08
4.78	STANDARD DEVIATION	1.88
0.14	STD ERROR (STD DEV)	0.05
93.20	MINIMUM	36.69
120.80	MAXIMUM	47.56
SKEWNESS		0.22
KURTOSIS		2.81
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		617

MALES		
CM		IN
113.40	MEAN	44.65
0.15	STD ERROR (MEAN)	0.06
5.57	STANDARD DEVIATION	2.19
0.11	STD ERROR (STD DEV)	0.04
97.30	MINIMUM	38.31
128.40	MAXIMUM	50.55
SKEWNESS		0.15
KURTOSIS		2.80
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
2	0.32	2	0.32	92.55	-	93.55					
1	0.16	3	0.49	93.55	-	94.55					
3	0.49	6	0.97	94.55	-	95.55					
6	0.97	12	1.94	95.55	-	96.55					
12	1.94	24	3.89	96.55	-	97.55		1	0.08	1	0.08
18	2.92	42	6.81	97.55	-	98.55		2	0.15	3	0.23
25	4.05	67	10.86	98.55	-	99.55		1	0.08	4	0.31
32	5.19	99	16.05	99.55	-	100.55		2	0.15	6	0.46
31	5.02	130	21.07	100.55	-	101.55		5	0.38	11	0.85
44	7.13	174	28.20	101.55	-	102.55		12	0.92	23	1.77
51	8.27	225	36.47	102.55	-	103.55		24	1.84	47	3.61
48	7.78	273	44.25	103.55	-	104.55		24	1.84	71	5.46
55	8.91	328	53.16	104.55	-	105.55		33	2.54	104	7.99
53	8.59	381	61.75	105.55	-	106.55		40	3.07	144	11.07
35	5.67	416	67.42	106.55	-	107.55		56	4.30	200	15.37
39	6.32	455	73.74	107.55	-	108.55		44	3.38	244	18.75
33	5.35	488	79.09	108.55	-	109.55		71	5.46	315	24.21
29	4.70	517	83.79	109.55	-	110.55		84	6.46	399	30.67
34	5.51	551	89.30	110.55	-	111.55		101	7.76	500	38.43
17	2.76	568	92.06	111.55	-	112.55		91	6.99	591	45.43
16	2.59	584	94.65	112.55	-	113.55		108	8.30	699	53.73
13	2.11	597	96.76	113.55	-	114.55		88	6.76	787	60.49
7	1.13	604	97.89	114.55	-	115.55		63	4.84	850	65.33
4	0.65	608	98.54	115.55	-	116.55		85	6.53	935	71.87
5	0.81	613	99.35	116.55	-	117.55		73	5.61	1008	77.48
1	0.16	614	99.51	117.55	-	118.55		64	4.92	1072	82.40
1	0.16	615	99.68	118.55	-	119.55		41	3.15	1113	85.55
1	0.16	616	99.84	119.55	-	120.55		48	3.69	1161	89.24
1	0.16	617	100.00	120.55	-	121.55		36	2.77	1197	92.01
				121.55	-	122.55		29	2.23	1226	94.24
				122.55	-	123.55		18	1.38	1244	95.62
				123.55	-	124.55		19	1.46	1263	97.08
				124.55	-	125.55		14	1.08	1277	98.16
				125.55	-	126.55		6	0.46	1283	98.62
				126.55	-	127.55		11	0.85	1294	99.46
				127.55	-	128.55		7	0.54	1301	100.00

(43) HAND BREADTH

The breadth of the right hand between the landmarks at metacarpale II and metacarpale V is measured with a sliding caliper. The participant places the palm on a table with the fingers together and the thumb abducted. The middle finger is parallel to the long axis of the forearm. The two distal phalanges of the fingers lie on a flat surface 8 mm higher than the table.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
7.10	2.80	1ST	8.00	3.15
7.20	2.83	2ND	8.10	3.19
7.20	2.83	3RD	8.11	3.19
7.30	2.87	5TH	8.30	3.27
7.50	2.95	10TH	8.40	3.31
7.50	2.95	15TH	8.50	3.35
7.60	2.99	20TH	8.50	3.35
7.70	3.03	25TH	8.60	3.39
7.70	3.03	30TH	8.70	3.43
7.80	3.07	35TH	8.80	3.46
7.80	3.07	40TH	8.80	3.46
7.80	3.07	45TH	8.90	3.50
7.90	3.11	50TH	8.90	3.50
7.90	3.11	55TH	9.00	3.54
8.00	3.15	60TH	9.00	3.54
8.00	3.15	65TH	9.10	3.58
8.10	3.19	70TH	9.20	3.62
8.10	3.19	75TH	9.20	3.62
8.20	3.23	80TH	9.30	3.66
8.30	3.27	85TH	9.40	3.70
8.40	3.31	90TH	9.50	3.74
8.50	3.35	95TH	9.70	3.82
8.70	3.43	97TH	9.80	3.86
8.70	3.43	98TH	9.90	3.90
8.88	3.49	99TH	10.00	3.94

(43) HAND BREADTH

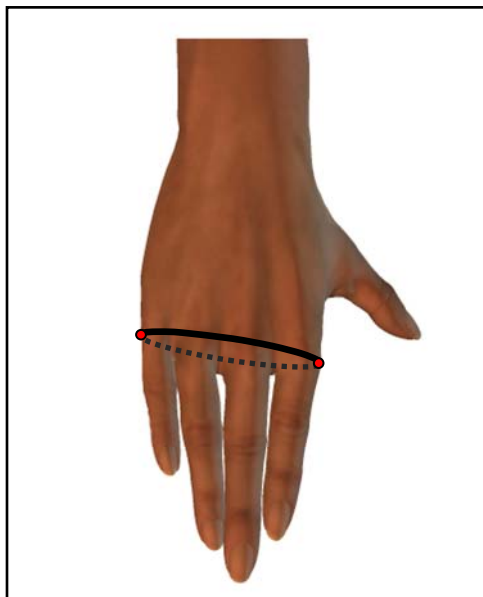
FEMALES		
<u>CM</u>		<u>IN</u>
7.91	MEAN	3.11
0.01	STD ERROR (MEAN)	0.01
0.37	STANDARD DEVIATION	0.15
0.01	STD ERROR (STD DEV)	0.00
6.90	MINIMUM	2.72
9.60	MAXIMUM	3.78
SKEWNESS		0.42
KURTOSIS		3.91
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
8.95	MEAN	3.52
0.01	STD ERROR (MEAN)	0.00
0.44	STANDARD DEVIATION	0.17
0.01	STD ERROR (STD DEV)	0.00
7.80	MINIMUM	3.07
10.60	MAXIMUM	4.17
SKEWNESS		0.23
KURTOSIS		3.01
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES			MALES			
E	FPct	CumF	CumFPct		CM		E	FPct	CumF	CumFPct
1	0.16	1	0.16	6.85	-	6.95				
2	0.32	3	0.48	6.95	-	7.05				
6	0.97	9	1.45	7.05	-	7.15				
10	1.61	19	3.06	7.15	-	7.25				
14	2.26	33	5.32	7.25	-	7.35				
27	4.35	60	9.68	7.35	-	7.45				
41	6.61	101	16.29	7.45	-	7.55				
38	6.13	139	22.42	7.55	-	7.65				
65	10.48	204	32.90	7.65	-	7.75				
84	13.55	288	46.45	7.75	-	7.85	4	0.31	4	0.31
56	9.03	344	55.48	7.85	-	7.95	3	0.23	7	0.54
87	14.03	431	69.52	7.95	-	8.05	9	0.69	16	1.23
44	7.10	475	76.61	8.05	-	8.15	23	1.77	39	3.00
43	6.94	518	83.55	8.15	-	8.25	25	1.92	64	4.92
33	5.32	551	88.87	8.25	-	8.35	35	2.69	99	7.61
25	4.03	576	92.90	8.35	-	8.45	74	5.69	173	13.30
17	2.74	593	95.65	8.45	-	8.55	88	6.76	261	20.06
8	1.29	601	96.94	8.55	-	8.65	73	5.61	334	25.67
8	1.29	609	98.23	8.65	-	8.75	107	8.22	441	33.90
5	0.81	614	99.03	8.75	-	8.85	113	8.69	554	42.58
2	0.32	616	99.35	8.85	-	8.95	98	7.53	652	50.12
1	0.16	617	99.52	8.95	-	9.05	150	11.53	802	61.64
0	0.00	617	99.52	9.05	-	9.15	95	7.30	897	68.95
1	0.16	618	99.68	9.15	-	9.25	86	6.61	983	75.56
1	0.16	619	99.84	9.25	-	9.35	82	6.30	1065	81.86
0	0.00	619	99.84	9.35	-	9.45	69	5.30	1134	87.16
0	0.00	619	99.84	9.45	-	9.55	63	4.84	1197	92.01
1	0.16	620	100.00	9.55	-	9.65	28	2.15	1225	94.16
				9.65	-	9.75	22	1.69	1247	95.85
				9.75	-	9.85	19	1.46	1266	97.31
				9.85	-	9.95	11	0.85	1277	98.16
				9.95	-	10.05	12	0.92	1289	99.08
				10.05	-	10.15	5	0.38	1294	99.46
				10.15	-	10.25	2	0.15	1296	99.62
				10.25	-	10.35	3	0.23	1299	99.85
				10.35	-	10.45	1	0.08	1300	99.92
				10.45	-	10.55	0	0.00	1300	99.92
				10.55	-	10.65	1	0.08	1301	100.00

(44) HAND CIRCUMFERENCE

The circumference of the right hand is measured with a tape passing over the landmarks at metacarpale II and metacarpale V. The participant places the palm on a table with the fingers together and the thumb abducted. The middle finger is parallel to the long axis of the forearm. The two distal phalanges of the fingers lie on a flat surface 8 mm higher than the table.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
16.80	6.61	1ST	19.00	7.48
17.00	6.69	2ND	19.20	7.56
17.20	6.77	3RD	19.30	7.60
17.30	6.81	5TH	19.50	7.68
17.60	6.93	10TH	19.80	7.80
17.80	7.01	15TH	20.10	7.91
18.00	7.09	20TH	20.20	7.95
18.00	7.09	25TH	20.40	8.03
18.13	7.14	30TH	20.50	8.07
18.20	7.17	35TH	20.70	8.15
18.40	7.24	40TH	20.80	8.19
18.50	7.28	45TH	21.00	8.27
18.60	7.32	50TH	21.00	8.27
18.60	7.32	55TH	21.20	8.35
18.70	7.36	60TH	21.30	8.39
18.80	7.40	65TH	21.50	8.46
19.00	7.48	70TH	21.60	8.50
19.10	7.52	75TH	21.70	8.54
19.20	7.56	80TH	22.00	8.66
19.30	7.60	85TH	22.20	8.74
19.59	7.72	90TH	22.40	8.82
20.00	7.87	95TH	22.80	8.98
20.14	7.92	97TH	23.00	9.06
20.30	7.99	98TH	23.20	9.13
20.58	8.10	99TH	23.40	9.21

(44) HAND CIRCUMFERENCE

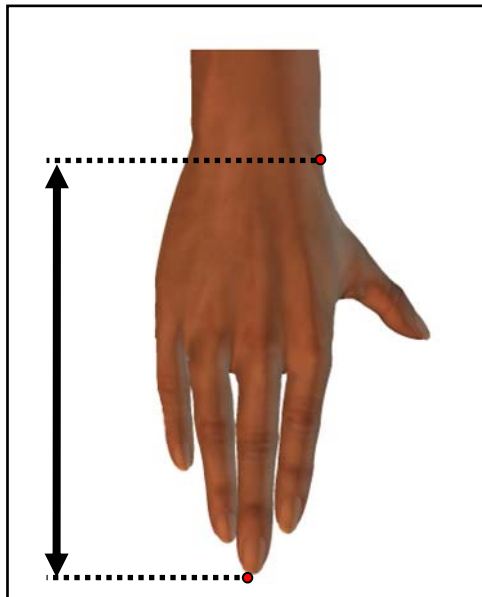
FEMALES		
CM		IN
18.58	MEAN	7.31
0.03	STD ERROR (MEAN)	0.01
0.79	STANDARD DEVIATION	0.31
0.02	STD ERROR (STD DEV)	0.01
16.30	MINIMUM	6.42
22.40	MAXIMUM	8.82
SKEWNESS		0.31
KURTOSIS		3.69
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
21.10	MEAN	8.31
0.03	STD ERROR (MEAN)	0.01
0.99	STANDARD DEVIATION	0.39
0.02	STD ERROR (STD DEV)	0.01
18.40	MINIMUM	7.24
24.30	MAXIMUM	9.57
SKEWNESS		0.22
KURTOSIS		2.85
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	16.15	-	16.35					
0	0.00	1	0.16	16.35	-	16.55					
3	0.48	4	0.65	16.55	-	16.75					
5	0.81	9	1.45	16.75	-	16.95					
8	1.29	17	2.74	16.95	-	17.15					
15	2.42	32	5.16	17.15	-	17.35					
28	4.52	60	9.68	17.35	-	17.55					
27	4.35	87	14.03	17.55	-	17.75					
32	5.16	119	19.19	17.75	-	17.95					
67	10.81	186	30.00	17.95	-	18.15					
61	9.84	247	39.84	18.15	-	18.35					
55	8.87	302	48.71	18.35	-	18.55		1	0.08	1	0.08
72	11.61	374	60.32	18.55	-	18.75		0	0.00	1	0.08
54	8.71	428	69.03	18.75	-	18.95		5	0.38	6	0.46
52	8.39	480	77.42	18.95	-	19.15		14	1.08	20	1.54
51	8.23	531	85.65	19.15	-	19.35		29	2.23	49	3.77
27	4.35	558	90.00	19.35	-	19.55		21	1.61	70	5.38
14	2.26	572	92.26	19.55	-	19.75		36	2.77	106	8.15
16	2.58	588	94.84	19.75	-	19.95		43	3.31	149	11.45
14	2.26	602	97.10	19.95	-	20.15		66	5.07	215	16.53
7	1.13	609	98.23	20.15	-	20.35		104	7.99	319	24.52
5	0.81	614	99.03	20.35	-	20.55		74	5.69	393	30.21
3	0.48	617	99.52	20.55	-	20.75		104	7.99	497	38.20
1	0.16	618	99.68	20.75	-	20.95		76	5.84	573	44.04
1	0.16	619	99.84	20.95	-	21.15		121	9.30	694	53.34
0	0.00	619	99.84	21.15	-	21.35		103	7.92	797	61.26
0	0.00	619	99.84	21.35	-	21.55		105	8.07	902	69.33
0	0.00	619	99.84	21.55	-	21.75		84	6.46	986	75.79
0	0.00	619	99.84	21.75	-	21.95		50	3.84	1036	79.63
0	0.00	619	99.84	21.95	-	22.15		65	5.00	1101	84.63
0	0.00	619	99.84	22.15	-	22.35		55	4.23	1156	88.85
1	0.16	620	100.00	22.35	-	22.55		41	3.15	1197	92.01
				22.55	-	22.75		38	2.92	1235	94.93
				22.75	-	22.95		22	1.69	1257	96.62
				22.95	-	23.15		14	1.08	1271	97.69
				23.15	-	23.35		17	1.31	1288	99.00
				23.35	-	23.55		3	0.23	1291	99.23
				23.55	-	23.75		0	0.00	1291	99.23
				23.75	-	23.95		2	0.15	1293	99.39
				23.95	-	24.15		4	0.31	1297	99.69
				24.15	-	24.35		4	0.31	1301	100.00

(45) HAND LENGTH

The length of the right hand between the stylium landmark on the wrist and the tip of the middle finger is measured with a Poech sliding caliper. The participant places the palm on a table with the fingers together and the thumb abducted. The middle finger is parallel to the long axis of the forearm. The two distal phalanges of the fingers lie on a flat surface 8 mm higher than the table.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
15.82	6.23	1ST	17.40	6.85
16.10	6.34	2ND	17.60	6.93
16.26	6.41	3RD	17.70	6.97
16.40	6.46	5TH	17.90	7.05
16.70	6.57	10TH	18.20	7.17
16.90	6.65	15TH	18.40	7.24
17.10	6.73	20TH	18.50	7.28
17.20	6.77	25TH	18.70	7.36
17.30	6.81	30TH	18.80	7.40
17.40	6.85	35TH	19.00	7.48
17.50	6.89	40TH	19.10	7.52
17.60	6.93	45TH	19.20	7.56
17.70	6.97	50TH	19.30	7.60
17.80	7.01	55TH	19.50	7.68
18.00	7.09	60TH	19.60	7.72
18.10	7.13	65TH	19.70	7.76
18.30	7.20	70TH	19.90	7.83
18.40	7.24	75TH	20.00	7.87
18.60	7.32	80TH	20.20	7.95
18.80	7.40	85TH	20.40	8.03
19.10	7.52	90TH	20.60	8.11
19.40	7.64	95TH	21.10	8.31
19.50	7.68	97TH	21.40	8.43
19.70	7.76	98TH	21.50	8.46
19.90	7.83	99TH	21.80	8.58

(45) HAND LENGTH

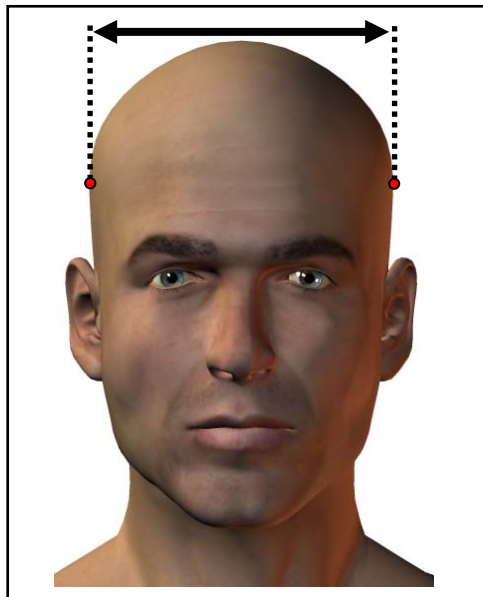
FEMALES		
CM		IN
17.81	MEAN	7.01
0.04	STD ERROR (MEAN)	0.01
0.90	STANDARD DEVIATION	0.35
0.03	STD ERROR (STD DEV)	0.01
15.40	MINIMUM	6.06
20.60	MAXIMUM	8.11
SKEWNESS		0.21
KURTOSIS		2.83
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
19.38	MEAN	7.63
0.03	STD ERROR (MEAN)	0.01
0.96	STANDARD DEVIATION	0.38
0.02	STD ERROR (STD DEV)	0.01
16.60	MINIMUM	6.54
23.70	MAXIMUM	9.33
SKEWNESS		0.30
KURTOSIS		3.12
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES		MALES			
E	FPct	CumF	CumFPct	CM		E	FPct	CumF	CumFPct
2	0.32	2	0.32	15.35	-	15.55			
2	0.32	4	0.65	15.55	-	15.75			
5	0.81	9	1.45	15.75	-	15.95			
5	0.81	14	2.26	15.95	-	16.15			
10	1.61	24	3.87	16.15	-	16.35			
24	3.87	48	7.74	16.35	-	16.55			
23	3.71	71	11.45	16.55	-	16.75			
29	4.68	100	16.13	16.75	-	16.95	1	0.08	1
36	5.81	136	21.94	16.95	-	17.15	2	0.15	3
64	10.32	200	32.26	17.15	-	17.35	3	0.23	6
63	10.16	263	42.42	17.35	-	17.55	2	0.15	8
53	8.55	316	50.97	17.55	-	17.75	15	1.15	23
52	8.39	368	59.35	17.75	-	17.95	22	1.69	45
38	6.13	406	65.48	17.95	-	18.15	33	2.54	78
50	8.06	456	73.55	18.15	-	18.35	43	3.31	121
34	5.48	490	79.03	18.35	-	18.55	54	4.15	175
35	5.65	525	84.68	18.55	-	18.75	101	7.76	276
25	4.03	550	88.71	18.75	-	18.95	75	5.76	351
17	2.74	567	91.45	18.95	-	19.15	90	6.92	441
19	3.06	586	94.52	19.15	-	19.35	110	8.46	551
17	2.74	603	97.26	19.35	-	19.55	103	7.92	654
8	1.29	611	98.55	19.55	-	19.75	109	8.38	763
4	0.65	615	99.19	19.75	-	19.95	103	7.92	866
2	0.32	617	99.52	19.95	-	20.15	78	6.00	944
1	0.16	618	99.68	20.15	-	20.35	84	6.46	1028
0	0.00	618	99.68	20.35	-	20.55	73	5.61	1101
2	0.32	620	100.00	20.55	-	20.75	64	4.92	1165
				20.75	-	20.95	32	2.46	1197
				20.95	-	21.15	30	2.31	1227
				21.15	-	21.35	15	1.15	1242
				21.35	-	21.55	19	1.46	1261
				21.55	-	21.75	15	1.15	1276
				21.75	-	21.95	9	0.69	1285
				21.95	-	22.15	6	0.46	1291
				22.15	-	22.35	5	0.38	1296
				22.35	-	22.55	4	0.31	1300
				22.55	-	22.75	0	0.00	1300
				22.75	-	22.95	0	0.00	1300
				22.95	-	23.15	0	0.00	1300
				23.15	-	23.35	0	0.00	1300
				23.35	-	23.55	0	0.00	1300
				23.55	-	23.75	1	0.08	1301

(46) HEAD BREADTH

The maximum horizontal breadth of the head above the plane of attachment of the ears is measured with a spreading caliper.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
13.52	5.32	1ST	14.20	5.59
13.70	5.39	2ND	14.40	5.67
13.76	5.42	3RD	14.40	5.67
13.90	5.47	5TH	14.60	5.75
14.00	5.51	10TH	14.70	5.79
14.10	5.55	15TH	14.80	5.83
14.20	5.59	20TH	15.00	5.91
14.30	5.63	25TH	15.00	5.91
14.30	5.63	30TH	15.10	5.94
14.40	5.67	35TH	15.20	5.98
14.40	5.67	40TH	15.30	6.02
14.50	5.71	45TH	15.30	6.02
14.60	5.75	50TH	15.40	6.06
14.60	5.75	55TH	15.50	6.10
14.70	5.79	60TH	15.50	6.10
14.70	5.79	65TH	15.60	6.14
14.80	5.83	70TH	15.70	6.18
14.80	5.83	75TH	15.78	6.21
15.00	5.91	80TH	15.80	6.22
15.00	5.91	85TH	16.00	6.30
15.10	5.94	90TH	16.10	6.34
15.30	6.02	95TH	16.30	6.42
15.50	6.10	97TH	16.40	6.46
15.60	6.14	98TH	16.50	6.50
15.70	6.18	99TH	16.70	6.57

(46) HEAD BREADTH

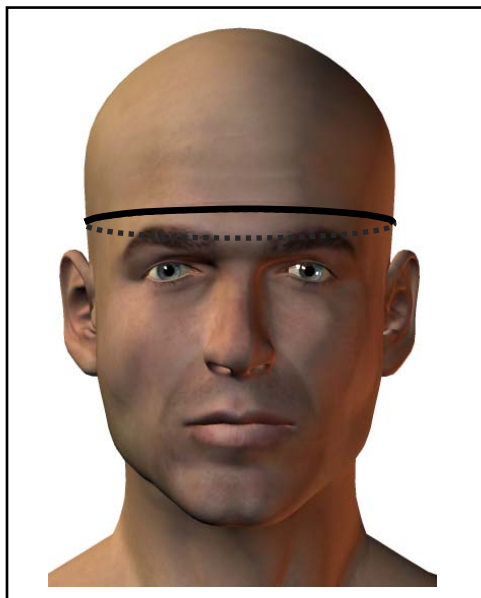
FEMALES		
CM		IN
14.57	MEAN	5.74
0.02	STD ERROR (MEAN)	0.01
0.46	STANDARD DEVIATION	0.18
0.01	STD ERROR (STD DEV)	0.01
13.30	MINIMUM	5.24
16.20	MAXIMUM	6.38
SKEWNESS		0.26
KURTOSIS		3.23
COEFFICIENT OF VARIATION		3.2%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
15.40	MEAN	6.06
0.01	STD ERROR (MEAN)	0.01
0.54	STANDARD DEVIATION	0.21
0.01	STD ERROR (STD DEV)	0.00
13.90	MINIMUM	5.47
17.70	MAXIMUM	6.97
SKEWNESS		0.19
KURTOSIS		3.19
COEFFICIENT OF VARIATION		3.5%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	13.25	-	13.35					
1	0.16	2	0.32	13.35	-	13.45					
4	0.65	6	0.97	13.45	-	13.55					
1	0.16	7	1.13	13.55	-	13.65					
11	1.77	18	2.90	13.65	-	13.75					
11	1.77	29	4.68	13.75	-	13.85					
20	3.23	49	7.90	13.85	-	13.95		3	0.23	3	0.23
29	4.68	78	12.58	13.95	-	14.05		3	0.23	6	0.46
36	5.81	114	18.39	14.05	-	14.15		6	0.46	12	0.92
38	6.13	152	24.52	14.15	-	14.25		7	0.54	19	1.46
47	7.58	199	32.10	14.25	-	14.35		6	0.46	25	1.92
54	8.71	253	40.81	14.35	-	14.45		14	1.08	39	3.00
41	6.61	294	47.42	14.45	-	14.55		22	1.69	61	4.69
56	9.03	350	56.45	14.55	-	14.65		41	3.15	102	7.85
65	10.48	415	66.94	14.65	-	14.75		55	4.23	157	12.08
53	8.55	468	75.48	14.75	-	14.85		50	3.85	207	15.92
24	3.87	492	79.35	14.85	-	14.95		51	3.92	258	19.85
44	7.10	536	86.45	14.95	-	15.05		103	7.92	361	27.77
24	3.87	560	90.32	15.05	-	15.15		77	5.92	438	33.69
14	2.26	574	92.58	15.15	-	15.25		76	5.85	514	39.54
17	2.74	591	95.32	15.25	-	15.35		78	6.00	592	45.54
7	1.13	598	96.45	15.35	-	15.45		107	8.23	699	53.77
7	1.13	605	97.58	15.45	-	15.55		96	7.38	795	61.15
7	1.13	612	98.71	15.55	-	15.65		104	8.00	899	69.15
3	0.48	615	99.19	15.65	-	15.75		76	5.85	975	75.00
1	0.16	616	99.35	15.75	-	15.85		74	5.69	1049	80.69
1	0.16	617	99.52	15.85	-	15.95		49	3.77	1098	84.46
1	0.16	618	99.68	15.95	-	16.05		64	4.92	1162	89.38
0	0.00	618	99.68	16.05	-	16.15		25	1.92	1187	91.31
2	0.32	620	100.00	16.15	-	16.25		25	1.92	1212	93.23
				16.25	-	16.35		32	2.46	1244	95.69
				16.35	-	16.45		21	1.62	1265	97.31
				16.45	-	16.55		12	0.92	1277	98.23
				16.55	-	16.65		8	0.62	1285	98.85
				16.65	-	16.75		3	0.23	1288	99.08
				16.75	-	16.85		5	0.38	1293	99.46
				16.85	-	16.95		1	0.08	1294	99.54
				16.95	-	17.05		3	0.23	1297	99.77
				17.05	-	17.15		0	0.00	1297	99.77
				17.15	-	17.25		1	0.08	1298	99.85
				17.25	-	17.35		0	0.00	1298	99.85
				17.35	-	17.45		0	0.00	1298	99.85
				17.45	-	17.55		1	0.08	1299	99.92
				17.55	-	17.65		0	0.00	1299	99.92
				17.65	-	17.75		1	0.08	1300	100.00

(47) HEAD CIRCUMFERENCE

The maximum circumference of the head above the attachment of the ears is measured with a tape passing just above the ridges of the eyebrows and around the back of the head.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
52.22	20.56	1ST	53.50	21.06
52.50	20.67	2ND	54.00	21.26
52.50	20.67	3RD	54.30	21.38
52.81	20.79	5TH	54.60	21.50
53.40	21.02	10TH	55.10	21.69
53.80	21.18	15TH	55.53	21.86
54.10	21.30	20TH	55.80	21.97
54.30	21.38	25TH	56.10	22.09
54.60	21.50	30TH	56.30	22.17
54.80	21.57	35TH	56.50	22.24
55.00	21.65	40TH	56.70	22.32
55.20	21.73	45TH	56.90	22.40
55.40	21.81	50TH	57.10	22.48
55.60	21.89	55TH	57.20	22.52
55.80	21.97	60TH	57.50	22.64
56.10	22.09	65TH	57.70	22.72
56.30	22.17	70TH	57.90	22.80
56.60	22.28	75TH	58.15	22.89
57.00	22.44	80TH	58.40	22.99
57.30	22.56	85TH	58.70	23.11
57.70	22.72	90TH	59.00	23.23
58.60	23.07	95TH	59.50	23.43
59.04	23.24	97TH	59.80	23.54
59.76	23.52	98TH	60.20	23.70
60.44	23.79	99TH	60.90	23.98

(47) HEAD CIRCUMFERENCE

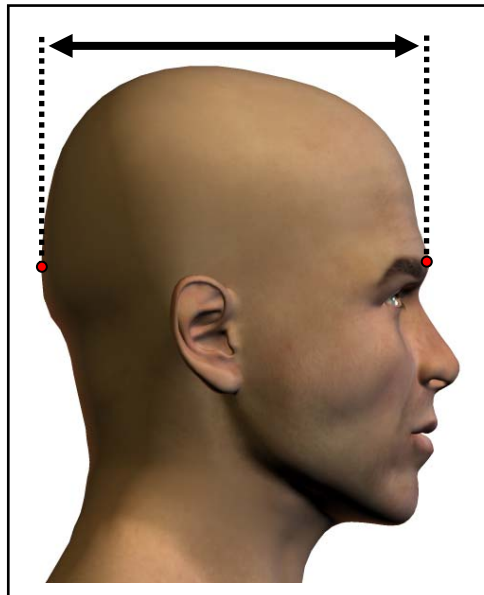
FEMALES		
<u>CM</u>		<u>IN</u>
55.54	MEAN	21.87
0.07	STD ERROR (MEAN)	0.03
1.74	STANDARD DEVIATION	0.68
0.05	STD ERROR (STD DEV)	0.02
51.00	MINIMUM	20.08
61.60	MAXIMUM	24.25
SKEWNESS		0.49
KURTOSIS		3.43
COEFFICIENT OF VARIATION		3.1%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
57.10	MEAN	22.48
0.04	STD ERROR (MEAN)	0.02
1.52	STANDARD DEVIATION	0.60
0.03	STD ERROR (STD DEV)	0.01
51.30	MINIMUM	20.20
62.70	MAXIMUM	24.69
SKEWNESS		0.05
KURTOSIS		3.07
COEFFICIENT OF VARIATION		2.7%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES			MALES			
F	FPct	CumF	CumFPct		CM		F	FPct	CumF	CumFPct
1	0.16	1	0.16	50.85	-	51.10				
0	0.00	1	0.16	51.10	-	51.35	1	0.08	1	0.08
0	0.00	1	0.16	51.35	-	51.60	0	0.00	1	0.08
1	0.16	2	0.32	51.60	-	51.85	0	0.00	1	0.08
0	0.00	2	0.32	51.85	-	52.10	0	0.00	1	0.08
7	1.13	9	1.45	52.10	-	52.35	0	0.00	1	0.08
11	1.77	20	3.23	52.35	-	52.60	0	0.00	1	0.08
11	1.77	31	5.00	52.60	-	52.85	1	0.08	2	0.15
10	1.61	41	6.61	52.85	-	53.10	0	0.00	2	0.15
19	3.06	60	9.68	53.10	-	53.35	4	0.31	6	0.46
19	3.06	79	12.74	53.35	-	53.60	7	0.54	13	1.00
26	4.19	105	16.94	53.60	-	53.85	6	0.46	19	1.46
17	2.74	122	19.68	53.85	-	54.10	7	0.54	26	2.00
38	6.13	160	25.81	54.10	-	54.35	15	1.15	41	3.15
24	3.87	184	29.68	54.35	-	54.60	19	1.46	60	4.61
35	5.65	219	35.32	54.60	-	54.85	34	2.61	94	7.23
37	5.97	256	41.29	54.85	-	55.10	28	2.15	122	9.38
52	8.39	308	49.68	55.10	-	55.35	44	3.38	166	12.76
31	5.00	339	54.68	55.35	-	55.60	29	2.23	195	14.99
39	6.29	378	60.97	55.60	-	55.85	74	5.69	269	20.68
20	3.23	398	64.19	55.85	-	56.10	47	3.61	316	24.29
41	6.61	439	70.81	56.10	-	56.35	86	6.61	402	30.90
25	4.03	464	74.84	56.35	-	56.60	79	6.07	481	36.97
20	3.23	484	78.06	56.60	-	56.85	94	7.23	575	44.20
24	3.87	508	81.94	56.85	-	57.10	70	5.38	645	49.58
20	3.23	528	85.16	57.10	-	57.35	113	8.69	758	58.26
22	3.55	550	88.71	57.35	-	57.60	47	3.61	805	61.88
17	2.74	567	91.45	57.60	-	57.85	89	6.84	894	68.72
3	0.48	570	91.94	57.85	-	58.10	62	4.77	956	73.48
13	2.10	583	94.03	58.10	-	58.35	76	5.84	1032	79.32
6	0.97	589	95.00	58.35	-	58.60	49	3.77	1081	83.09
8	1.29	597	96.29	58.60	-	58.85	57	4.38	1138	87.47
5	0.81	602	97.10	58.85	-	59.10	42	3.23	1180	90.70
2	0.32	604	97.42	59.10	-	59.35	33	2.54	1213	93.24
3	0.48	607	97.90	59.35	-	59.60	29	2.23	1242	95.47
2	0.32	609	98.23	59.60	-	59.85	23	1.77	1265	97.23
4	0.65	613	98.87	59.85	-	60.10	4	0.31	1269	97.54
1	0.16	614	99.03	60.10	-	60.35	11	0.85	1280	98.39
1	0.16	615	99.19	60.35	-	60.60	4	0.31	1284	98.69
0	0.00	615	99.19	60.60	-	60.85	4	0.31	1288	99.00
1	0.16	616	99.35	60.85	-	61.10	4	0.31	1292	99.31
0	0.00	616	99.35	61.10	-	61.35	4	0.31	1296	99.62
3	0.48	619	99.84	61.35	-	61.60	2	0.15	1298	99.77
1	0.16	620	100.00	61.60	-	61.85	1	0.08	1299	99.85
				61.85	-	62.10	0	0.00	1299	99.85
				62.10	-	62.35	1	0.08	1300	99.92
				62.35	-	62.60	0	0.00	1300	99.92
				62.60	-	62.85	1	0.08	1301	100.00

(48) HEAD LENGTH

The distance from the glabella landmark to the opisthocranion landmark is measured with a spreading caliper.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
17.20	6.77	1ST	18.30	7.20
17.40	6.85	2ND	18.40	7.24
17.50	6.89	3RD	18.60	7.32
17.70	6.97	5TH	18.80	7.40
18.00	7.09	10TH	19.00	7.48
18.19	7.16	15TH	19.20	7.56
18.30	7.20	20TH	19.30	7.60
18.40	7.24	25TH	19.40	7.64
18.50	7.28	30TH	19.60	7.72
18.60	7.32	35TH	19.60	7.72
18.70	7.36	40TH	19.70	7.76
18.80	7.40	45TH	19.80	7.80
18.90	7.44	50TH	19.90	7.83
19.00	7.48	55TH	20.00	7.87
19.00	7.48	60TH	20.10	7.91
19.10	7.52	65TH	20.20	7.95
19.20	7.56	70TH	20.30	7.99
19.33	7.61	75TH	20.30	7.99
19.50	7.68	80TH	20.50	8.07
19.60	7.72	85TH	20.60	8.11
19.70	7.76	90TH	20.70	8.15
20.00	7.87	95TH	21.00	8.27
20.20	7.95	97TH	21.20	8.35
20.36	8.01	98TH	21.30	8.39
20.58	8.10	99TH	21.50	8.46

(48) HEAD LENGTH

FEMALES		
<u>CM</u>		<u>IN</u>
18.87	MEAN	7.43
0.03	STD ERROR (MEAN)	0.01
0.70	STANDARD DEVIATION	0.28
0.02	STD ERROR (STD DEV)	0.01
16.50	MINIMUM	6.50
20.90	MAXIMUM	8.23
SKEWNESS		0.01
KURTOSIS		3.02
COEFFICIENT OF VARIATION		3.7%
NUMBER OF PARTICIPANTS		618

MALES		
<u>CM</u>		<u>IN</u>
19.89	MEAN	7.83
0.02	STD ERROR (MEAN)	0.01
0.68	STANDARD DEVIATION	0.27
0.01	STD ERROR (STD DEV)	0.01
17.80	MINIMUM	7.01
22.20	MAXIMUM	8.74
SKEWNESS		-0.01
KURTOSIS		3.09
COEFFICIENT OF VARIATION		3.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	16.35	-	16.55					
0	0.00	1	0.16	16.55	-	16.75					
0	0.00	1	0.16	16.75	-	16.95					
4	0.65	5	0.81	16.95	-	17.15					
4	0.65	9	1.46	17.15	-	17.35					
10	1.62	19	3.07	17.35	-	17.55					
14	2.27	33	5.34	17.55	-	17.75					
20	3.24	53	8.58	17.75	-	17.95		3	0.23	3	0.23
39	6.31	92	14.89	17.95	-	18.15		3	0.23	6	0.46
50	8.09	142	22.98	18.15	-	18.35		13	1.00	19	1.46
67	10.84	209	33.82	18.35	-	18.55		19	1.46	38	2.92
51	8.25	260	42.07	18.55	-	18.75		21	1.61	59	4.53
74	11.97	334	54.05	18.75	-	18.95		43	3.31	102	7.84
71	11.49	405	65.53	18.95	-	19.15		75	5.76	177	13.60
59	9.55	464	75.08	19.15	-	19.35		105	8.07	282	21.68
60	9.71	524	84.79	19.35	-	19.55		98	7.53	380	29.21
35	5.66	559	90.45	19.55	-	19.75		167	12.84	547	42.04
17	2.75	576	93.20	19.75	-	19.95		128	9.84	675	51.88
21	3.40	597	96.60	19.95	-	20.15		166	12.76	841	64.64
9	1.46	606	98.06	20.15	-	20.35		139	10.68	980	75.33
6	0.97	612	99.03	20.35	-	20.55		108	8.30	1088	83.63
4	0.65	616	99.68	20.55	-	20.75		87	6.69	1175	90.32
2	0.32	618	100.00	20.75	-	20.95		51	3.92	1226	94.24
				20.95	-	21.15		34	2.61	1260	96.85
				21.15	-	21.35		16	1.23	1276	98.08
				21.35	-	21.55		13	1.00	1289	99.08
				21.55	-	21.75		7	0.54	1296	99.62
				21.75	-	21.95		3	0.23	1299	99.85
				21.95	-	22.15		1	0.08	1300	99.92
				22.15	-	22.35		1	0.08	1301	100.00

(49) HEEL-ANKLE CIRCUMFERENCE

The circumference of the right foot is measured with a tape passing over the point at which the heel first contacts the table and over the dorsal juncture of the foot and leg landmark at the front of the ankle. The participant stands with the feet about 10 cm apart and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
27.70	10.91	1ST	30.50	12.01
28.00	11.02	2ND	30.80	12.13
28.06	11.05	3RD	31.10	12.24
28.30	11.14	5TH	31.40	12.36
29.00	11.42	10TH	32.00	12.60
29.20	11.50	15TH	32.30	12.72
29.40	11.57	20TH	32.60	12.83
29.60	11.65	25TH	32.80	12.91
29.80	11.73	30TH	33.10	13.03
30.00	11.81	35TH	33.40	13.15
30.20	11.89	40TH	33.60	13.23
30.35	11.95	45TH	33.80	13.31
30.50	12.01	50TH	34.00	13.39
30.70	12.09	55TH	34.20	13.46
30.80	12.13	60TH	34.30	13.50
31.00	12.20	65TH	34.50	13.58
31.20	12.28	70TH	34.80	13.70
31.30	12.32	75TH	35.00	13.78
31.50	12.40	80TH	35.40	13.94
31.90	12.56	85TH	35.70	14.06
32.20	12.68	90TH	36.10	14.21
32.70	12.87	95TH	36.70	14.45
33.30	13.11	97TH	37.00	14.57
33.62	13.24	98TH	37.40	14.72
34.46	13.56	99TH	38.10	15.00

(49) HEEL-ANKLE CIRCUMFERENCE

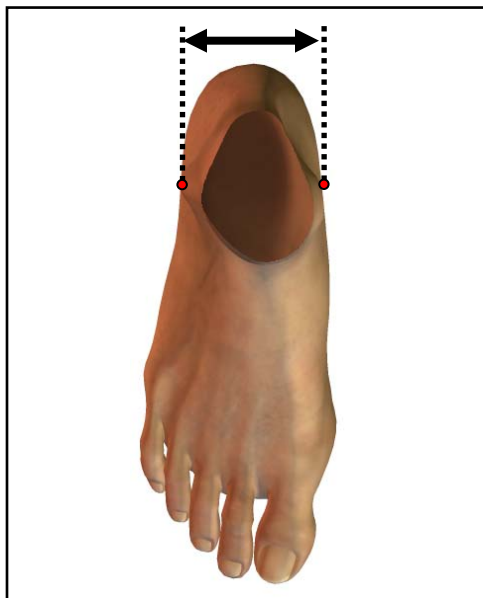
FEMALES		
CM		IN
30.53	MEAN	12.02
0.05	STD ERROR (MEAN)	0.02
1.36	STANDARD DEVIATION	0.53
0.04	STD ERROR (STD DEV)	0.02
25.50	MINIMUM	10.04
37.50	MAXIMUM	14.76
SKEWNESS		0.45
KURTOSIS		4.49
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
33.99	MEAN	13.38
0.04	STD ERROR (MEAN)	0.02
1.60	STANDARD DEVIATION	0.63
0.03	STD ERROR (STD DEV)	0.01
29.70	MINIMUM	11.69
40.00	MAXIMUM	15.75
SKEWNESS		0.19
KURTOSIS		2.98
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	25.25	-	25.75					
0	0.00	1	0.16	25.75	-	26.25					
0	0.00	1	0.16	26.25	-	26.75					
0	0.00	1	0.16	26.75	-	27.25					
6	0.97	7	1.13	27.25	-	27.75					
18	2.90	25	4.03	27.75	-	28.25					
24	3.87	49	7.90	28.25	-	28.75					
60	9.68	109	17.58	28.75	-	29.25					
75	12.10	184	29.68	29.25	-	29.75		1	0.08	1	0.08
75	12.10	259	41.77	29.75	-	30.25		8	0.61	9	0.69
93	15.00	352	56.77	30.25	-	30.75		12	0.92	21	1.61
102	16.45	454	73.23	30.75	-	31.25		32	2.46	53	4.07
59	9.52	513	82.74	31.25	-	31.75		46	3.54	99	7.61
53	8.55	566	91.29	31.75	-	32.25		83	6.38	182	13.99
26	4.19	592	95.48	32.25	-	32.75		116	8.92	298	22.91
8	1.29	600	96.77	32.75	-	33.25		115	8.84	413	31.74
11	1.77	611	98.55	33.25	-	33.75		165	12.68	578	44.43
2	0.32	613	98.87	33.75	-	34.25		160	12.30	738	56.73
2	0.32	615	99.19	34.25	-	34.75		171	13.14	909	69.87
3	0.48	618	99.68	34.75	-	35.25		109	8.38	1018	78.25
1	0.16	619	99.84	35.25	-	35.75		102	7.84	1120	86.09
0	0.00	619	99.84	35.75	-	36.25		73	5.61	1193	91.70
0	0.00	619	99.84	36.25	-	36.75		48	3.69	1241	95.39
0	0.00	619	99.84	36.75	-	37.25		27	2.08	1268	97.46
1	0.16	620	100.00	37.25	-	37.75		15	1.15	1283	98.62
				37.75	-	38.25		12	0.92	1295	99.54
				38.25	-	38.75		2	0.15	1297	99.69
				38.75	-	39.25		2	0.15	1299	99.85
				39.25	-	39.75		1	0.08	1300	99.92
				39.75	-	40.25		1	0.08	1301	100.00

(50) HEEL BREADTH

The maximum horizontal distance between the medial and lateral points of the right heel, at or posterior to the lateral malleolus landmark, is measured with a Holtain caliper. The measurement is taken just above the level of the standing surface at the most protruding points of the curvature of the heel. The participant stands with the feet about 10 cm apart and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
5.52	2.18	1ST	6.00	2.36
5.60	2.20	2ND	6.10	2.40
5.70	2.24	3RD	6.20	2.44
5.70	2.24	5TH	6.30	2.48
5.90	2.32	10TH	6.50	2.56
6.00	2.36	15TH	6.60	2.60
6.00	2.36	20TH	6.60	2.60
6.10	2.40	25TH	6.70	2.64
6.20	2.44	30TH	6.80	2.68
6.20	2.44	35TH	6.80	2.68
6.30	2.48	40TH	6.90	2.72
6.30	2.48	45TH	7.00	2.76
6.40	2.52	50TH	7.00	2.76
6.40	2.52	55TH	7.10	2.80
6.50	2.56	60TH	7.10	2.80
6.60	2.60	65TH	7.20	2.83
6.60	2.60	70TH	7.30	2.87
6.70	2.64	75TH	7.40	2.91
6.80	2.68	80TH	7.50	2.95
6.90	2.72	85TH	7.50	2.95
7.00	2.76	90TH	7.70	3.03
7.20	2.83	95TH	7.80	3.07
7.40	2.91	97TH	8.00	3.15
7.50	2.95	98TH	8.10	3.19
7.60	2.99	99TH	8.30	3.27

(50) HEEL BREADTH

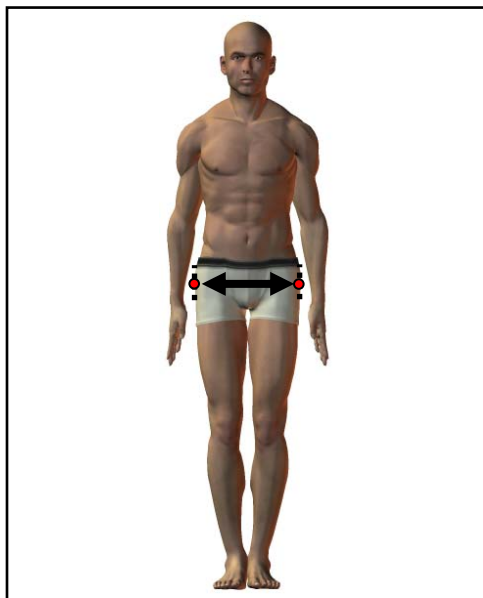
FEMALES		
CM		IN
6.43	MEAN	2.53
0.02	STD ERROR (MEAN)	0.01
0.44	STANDARD DEVIATION	0.17
0.01	STD ERROR (STD DEV)	0.00
5.40	MINIMUM	2.13
8.70	MAXIMUM	3.43
SKEWNESS		0.60
KURTOSIS		4.13
COEFFICIENT OF VARIATION		6.8%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
7.05	MEAN	2.77
0.01	STD ERROR (MEAN)	0.01
0.48	STANDARD DEVIATION	0.19
0.01	STD ERROR (STD DEV)	0.00
5.30	MINIMUM	2.09
9.20	MAXIMUM	3.62
SKEWNESS		0.35
KURTOSIS		3.62
COEFFICIENT OF VARIATION		6.8%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
2	0.32	2	0.32	5.25	-	5.35		1	0.08	1	0.08
4	0.65	6	0.97	5.35	-	5.45		0	0.00	1	0.08
10	1.61	16	2.58	5.45	-	5.55		0	0.00	1	0.08
16	2.58	32	5.16	5.55	-	5.65		0	0.00	1	0.08
15	2.42	47	7.58	5.65	-	5.75		0	0.00	1	0.08
20	3.23	67	10.81	5.75	-	5.85		2	0.15	3	0.23
60	9.68	127	20.48	5.85	-	5.95		3	0.23	6	0.46
45	7.26	172	27.74	5.95	-	6.05		12	0.92	18	1.38
58	9.35	230	37.10	6.05	-	6.15		13	1.00	31	2.38
54	8.71	284	45.81	6.15	-	6.25		23	1.77	54	4.15
58	9.35	342	55.16	6.25	-	6.35		17	1.31	71	5.46
59	9.52	401	64.68	6.35	-	6.45		52	4.00	123	9.45
44	7.10	445	71.77	6.45	-	6.55		70	5.38	193	14.83
36	5.81	481	77.58	6.55	-	6.65		71	5.46	264	20.29
39	6.29	520	83.87	6.65	-	6.75		88	6.76	352	27.06
28	4.52	548	88.39	6.75	-	6.85		110	8.46	462	35.51
32	5.16	580	93.55	6.85	-	6.95		79	6.07	541	41.58
4	0.65	584	94.19	6.95	-	7.05		170	13.07	711	54.65
11	1.77	595	95.97	7.05	-	7.15		89	6.84	800	61.49
6	0.97	601	96.94	7.15	-	7.25		88	6.76	888	68.26
6	0.97	607	97.90	7.25	-	7.35		70	5.38	958	73.64
6	0.97	613	98.87	7.35	-	7.45		79	6.07	1037	79.71
2	0.32	615	99.19	7.45	-	7.55		86	6.61	1123	86.32
0	0.00	615	99.19	7.55	-	7.65		45	3.46	1168	89.78
3	0.48	618	99.68	7.65	-	7.75		33	2.54	1201	92.31
0	0.00	618	99.68	7.75	-	7.85		38	2.92	1239	95.23
1	0.16	619	99.84	7.85	-	7.95		17	1.31	1256	96.54
0	0.00	619	99.84	7.95	-	8.05		17	1.31	1273	97.85
0	0.00	619	99.84	8.05	-	8.15		9	0.69	1282	98.54
0	0.00	619	99.84	8.15	-	8.25		5	0.38	1287	98.92
0	0.00	619	99.84	8.25	-	8.35		4	0.31	1291	99.23
0	0.00	619	99.84	8.35	-	8.45		1	0.08	1292	99.31
0	0.00	619	99.84	8.45	-	8.55		1	0.08	1293	99.39
0	0.00	619	99.84	8.55	-	8.65		4	0.31	1297	99.69
1	0.16	620	100.00	8.65	-	8.75		0	0.00	1297	99.69
				8.75	-	8.85		1	0.08	1298	99.77
				8.85	-	8.95		1	0.08	1299	99.85
				8.95	-	9.05		1	0.08	1300	99.92
				9.05	-	9.15		0	0.00	1300	99.92
				9.15	-	9.25		1	0.08	1301	100.00

(51) HIP BREADTH

The horizontal distance between the lateral buttock landmarks is measured with a beam caliper. The participant stands erect with the heels together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
29.30	11.54	1ST	29.70	11.69
29.74	11.71	2ND	30.10	11.85
30.06	11.84	3RD	30.40	11.97
30.61	12.05	5TH	30.80	12.13
31.40	12.36	10TH	31.40	12.36
31.82	12.53	15TH	31.90	12.56
32.32	12.73	20TH	32.40	12.76
32.80	12.91	25TH	32.70	12.87
33.10	13.03	30TH	33.00	12.99
33.34	13.12	35TH	33.30	13.11
33.70	13.27	40TH	33.60	13.23
33.90	13.35	45TH	33.90	13.35
34.30	13.50	50TH	34.10	13.43
34.50	13.58	55TH	34.40	13.54
34.70	13.66	60TH	34.70	13.66
34.97	13.77	65TH	35.00	13.78
35.30	13.90	70TH	35.20	13.86
35.60	14.02	75TH	35.60	14.02
36.00	14.17	80TH	36.00	14.17
36.50	14.37	85TH	36.50	14.37
37.30	14.69	90TH	37.00	14.57
38.10	15.00	95TH	38.10	15.00
38.74	15.25	97TH	38.79	15.28
39.26	15.45	98TH	39.10	15.39
40.00	15.75	99TH	39.70	15.63

(51) HIP BREADTH

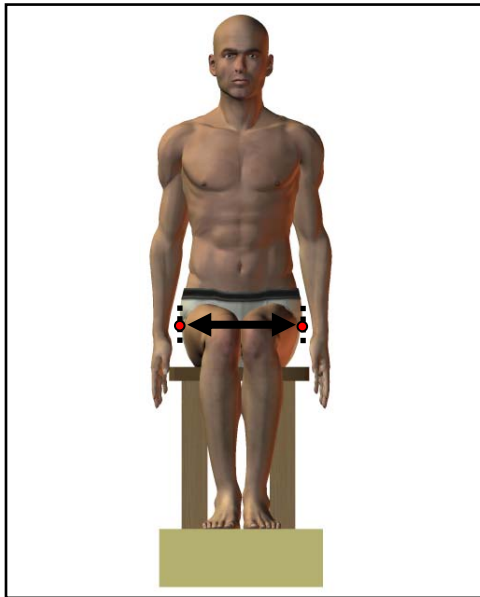
FEMALES		
CM		IN
34.24	MEAN	13.48
0.09	STD ERROR (MEAN)	0.04
2.27	STANDARD DEVIATION	0.89
0.06	STD ERROR (STD DEV)	0.03
28.10	MINIMUM	11.06
42.50	MAXIMUM	16.73
SKEWNESS		0.27
KURTOSIS		3.33
COEFFICIENT OF VARIATION		6.6%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
34.23	MEAN	13.48
0.06	STD ERROR (MEAN)	0.02
2.19	STANDARD DEVIATION	0.86
0.04	STD ERROR (STD DEV)	0.02
27.80	MINIMUM	10.94
42.80	MAXIMUM	16.85
SKEWNESS		0.33
KURTOSIS		3.19
COEFFICIENT OF VARIATION		6.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	27.75	-	28.25		1	0.08	1	0.08
2	0.32	3	0.48	28.25	-	28.75		0	0.00	1	0.08
1	0.16	4	0.65	28.75	-	29.25		5	0.38	6	0.46
8	1.29	12	1.94	29.25	-	29.75		9	0.69	15	1.15
9	1.45	21	3.39	29.75	-	30.25		14	1.08	29	2.23
13	2.10	34	5.48	30.25	-	30.75		32	2.46	61	4.69
20	3.23	54	8.71	30.75	-	31.25		48	3.69	109	8.38
31	5.00	85	13.71	31.25	-	31.75		62	4.77	171	13.14
33	5.32	118	19.03	31.75	-	32.25		71	5.46	242	18.60
36	5.81	154	24.84	32.25	-	32.75		88	6.76	330	25.37
55	8.87	209	33.71	32.75	-	33.25		122	9.38	452	34.74
48	7.74	257	41.45	33.25	-	33.75		101	7.76	553	42.51
52	8.39	309	49.84	33.75	-	34.25		122	9.38	675	51.88
69	11.13	378	60.97	34.25	-	34.75		114	8.76	789	60.65
50	8.06	428	69.03	34.75	-	35.25		129	9.92	918	70.56
55	8.87	483	77.90	35.25	-	35.75		91	6.99	1009	77.56
30	4.84	513	82.74	35.75	-	36.25		71	5.46	1080	83.01
25	4.03	538	86.77	36.25	-	36.75		57	4.38	1137	87.39
18	2.90	556	89.68	36.75	-	37.25		52	4.00	1189	91.39
21	3.39	577	93.06	37.25	-	37.75		24	1.84	1213	93.24
16	2.58	593	95.65	37.75	-	38.25		33	2.54	1246	95.77
9	1.45	602	97.10	38.25	-	38.75		16	1.23	1262	97.00
6	0.97	608	98.06	38.75	-	39.25		16	1.23	1278	98.23
5	0.81	613	98.87	39.25	-	39.75		11	0.85	1289	99.08
2	0.32	615	99.19	39.75	-	40.25		2	0.15	1291	99.23
2	0.32	617	99.52	40.25	-	40.75		5	0.38	1296	99.62
0	0.00	617	99.52	40.75	-	41.25		2	0.15	1298	99.77
0	0.00	617	99.52	41.25	-	41.75		1	0.08	1299	99.85
1	0.16	618	99.68	41.75	-	42.25		0	0.00	1299	99.85
2	0.32	620	100.00	42.25	-	42.75		1	0.08	1300	99.92
				42.75	-	43.25		1	0.08	1301	100.00

(52) HIP BREADTH, SITTING

The distance between the lateral points of the hips or thighs (whichever are broader) is measured with a beam caliper. The participant sits erect with the feet and knees together.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
33.48	13.18	1ST	32.00	12.60
34.34	13.52	2ND	32.50	12.80
34.76	13.69	3RD	32.80	12.91
35.20	13.86	5TH	33.30	13.11
36.00	14.17	10TH	34.00	13.39
36.60	14.41	15TH	34.60	13.62
37.02	14.58	20TH	35.10	13.82
37.60	14.80	25TH	35.50	13.98
38.00	14.96	30TH	35.80	14.09
38.30	15.08	35TH	36.10	14.21
38.60	15.20	40TH	36.40	14.33
39.00	15.35	45TH	36.80	14.49
39.30	15.47	50TH	37.10	14.61
39.60	15.59	55TH	37.40	14.72
40.00	15.75	60TH	37.72	14.85
40.30	15.87	65TH	38.10	15.00
40.70	16.02	70TH	38.50	15.16
41.00	16.14	75TH	39.00	15.35
41.48	16.33	80TH	39.50	15.55
42.10	16.57	85TH	40.10	15.79
42.79	16.85	90TH	40.88	16.09
44.20	17.40	95TH	42.10	16.57
45.00	17.72	97TH	42.79	16.85
45.69	17.99	98TH	43.40	17.09
47.38	18.65	99TH	43.90	17.28

(52) HIP BREADTH, SITTING

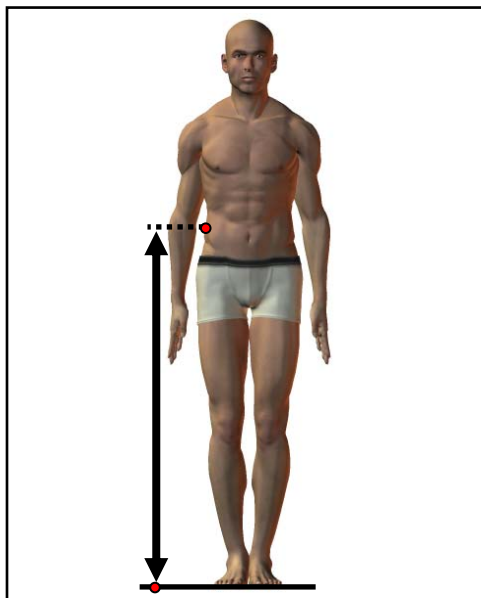
FEMALES		
CM		IN
39.41	MEAN	15.52
0.11	STD ERROR (MEAN)	0.04
2.76	STANDARD DEVIATION	1.09
0.08	STD ERROR (STD DEV)	0.03
31.60	MINIMUM	12.44
50.60	MAXIMUM	19.92
SKEWNESS		0.47
KURTOSIS		3.91
COEFFICIENT OF VARIATION		7.0%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
37.31	MEAN	14.69
0.07	STD ERROR (MEAN)	0.03
2.64	STANDARD DEVIATION	1.04
0.05	STD ERROR (STD DEV)	0.02
30.70	MINIMUM	12.09
47.70	MAXIMUM	18.78
SKEWNESS		0.43
KURTOSIS		3.17
COEFFICIENT OF VARIATION		7.1%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM		CM		E	FPct	CumF	CumFPct
				30.25	-	30.75		2	0.15	2	0.15
				30.75	-	31.25		1	0.08	3	0.23
1	0.16	1	0.16	31.25	-	31.75		4	0.31	7	0.54
0	0.00	1	0.16	31.75	-	32.25		10	0.77	17	1.31
2	0.32	3	0.48	32.25	-	32.75		17	1.31	34	2.61
2	0.32	5	0.81	32.75	-	33.25		29	2.23	63	4.84
1	0.16	6	0.97	33.25	-	33.75		37	2.84	100	7.69
4	0.65	10	1.61	33.75	-	34.25		48	3.69	148	11.38
8	1.29	18	2.90	34.25	-	34.75		61	4.69	209	16.06
16	2.58	34	5.48	34.75	-	35.25		77	5.92	286	21.98
18	2.90	52	8.39	35.25	-	35.75		96	7.38	382	29.36
23	3.71	75	12.10	35.75	-	36.25		108	8.30	490	37.66
28	4.52	103	16.61	36.25	-	36.75		93	7.15	583	44.81
33	5.32	136	21.94	36.75	-	37.25		99	7.61	682	52.42
32	5.16	168	27.10	37.25	-	37.75		99	7.61	781	60.03
44	7.10	212	34.19	37.75	-	38.25		84	6.46	865	66.49
47	7.58	259	41.77	38.25	-	38.75		83	6.38	948	72.87
46	7.42	305	49.19	38.75	-	39.25		61	4.69	1009	77.56
50	8.06	355	57.26	39.25	-	39.75		66	5.07	1075	82.63
44	7.10	399	64.35	39.75	-	40.25		43	3.31	1118	85.93
41	6.61	440	70.97	40.25	-	40.75		42	3.23	1160	89.16
41	6.61	481	77.58	40.75	-	41.25		43	3.31	1203	92.47
28	4.52	509	82.10	41.25	-	41.75		17	1.31	1220	93.77
24	3.87	533	85.97	41.75	-	42.25		26	2.00	1246	95.77
25	4.03	558	90.00	42.25	-	42.75		16	1.23	1262	97.00
14	2.26	572	92.26	42.75	-	43.25		9	0.69	1271	97.69
8	1.29	580	93.55	43.25	-	43.75		12	0.92	1283	98.62
10	1.61	590	95.16	43.75	-	44.25		8	0.61	1291	99.23
11	1.77	601	96.94	44.25	-	44.75		2	0.15	1293	99.39
4	0.65	605	97.58	44.75	-	45.25		1	0.08	1294	99.46
3	0.48	608	98.06	45.25	-	45.75		3	0.23	1297	99.69
2	0.32	610	98.39	45.75	-	46.25		2	0.15	1299	99.85
2	0.32	612	98.71	46.25	-	46.75		0	0.00	1299	99.85
1	0.16	613	98.87	46.75	-	47.25		1	0.08	1300	99.92
2	0.32	615	99.19	47.25	-	47.75		1	0.08	1301	100.00
1	0.16	616	99.35	47.75	-	48.25					
0	0.00	616	99.35	48.25	-	48.75					
1	0.16	617	99.52	48.75	-	49.25					
1	0.16	618	99.68	49.25	-	49.75					
1	0.16	619	99.84	49.75	-	50.25					
1	0.16	620	100.00	50.25	-	50.75					

(53) ILIOCRISTALE HEIGHT

The vertical distance between a standing surface and the right iliocrestale landmark is measured with an anthropometer. The participant stands erect with the heels together and the weight distributed equally on both feet. The shoulders and upper extremities are relaxed.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
89.94	35.41	1ST	95.00	37.40
90.74	35.73	2ND	96.20	37.87
91.50	36.02	3RD	97.00	38.19
92.41	36.38	5TH	97.91	38.54
94.10	37.05	10TH	99.21	39.06
95.02	37.41	15TH	100.60	39.61
96.00	37.80	20TH	101.50	39.96
96.60	38.03	25TH	102.20	40.24
97.80	38.50	30TH	103.00	40.55
98.20	38.66	35TH	103.80	40.87
98.84	38.92	40TH	104.50	41.14
99.55	39.19	45TH	105.10	41.38
100.20	39.45	50TH	105.75	41.63
100.80	39.69	55TH	106.50	41.93
101.26	39.86	60TH	107.10	42.17
101.90	40.12	65TH	107.90	42.48
102.57	40.38	70TH	108.60	42.76
103.10	40.59	75TH	109.40	43.07
103.90	40.91	80TH	110.68	43.57
104.90	41.30	85TH	111.80	44.02
106.00	41.73	90TH	113.20	44.57
107.40	42.28	95TH	115.10	45.31
108.41	42.68	97TH	116.89	46.02
109.63	43.16	98TH	117.90	46.42
111.28	43.81	99TH	119.30	46.97

(53) ILIOCRISTALE HEIGHT

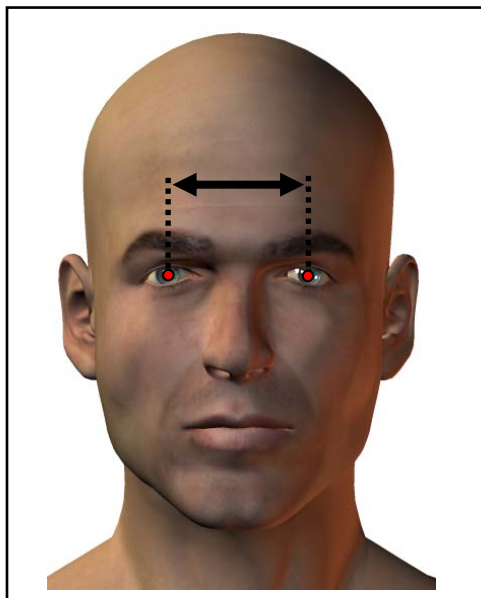
FEMALES		
CM		IN
100.06	MEAN	39.39
0.19	STD ERROR (MEAN)	0.07
4.62	STANDARD DEVIATION	1.82
0.13	STD ERROR (STD DEV)	0.05
88.00	MINIMUM	34.65
114.90	MAXIMUM	45.24
SKEWNESS		0.10
KURTOSIS		2.85
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
106.03	MEAN	41.74
0.15	STD ERROR (MEAN)	0.06
5.33	STANDARD DEVIATION	2.10
0.10	STD ERROR (STD DEV)	0.04
88.50	MINIMUM	34.84
124.00	MAXIMUM	48.82
SKEWNESS		0.23
KURTOSIS		2.98
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				F	FPct	CumF	CumFPct
1	0.16	1	0.16	87.55	-	88.55		1	0.08	1	0.08
2	0.32	3	0.48	88.55	-	89.55		1	0.08	2	0.15
7	1.13	10	1.61	89.55	-	90.55		0	0.00	2	0.15
10	1.61	20	3.23	90.55	-	91.55		2	0.15	4	0.31
12	1.94	32	5.16	91.55	-	92.55		1	0.08	5	0.38
15	2.42	47	7.58	92.55	-	93.55		2	0.15	7	0.54
35	5.65	82	13.23	93.55	-	94.55		3	0.23	10	0.77
27	4.35	109	17.58	94.55	-	95.55		7	0.54	17	1.31
44	7.10	153	24.68	95.55	-	96.55		13	1.00	30	2.31
25	4.03	178	28.71	96.55	-	97.55		23	1.77	53	4.08
53	8.55	231	37.26	97.55	-	98.55		42	3.23	95	7.31
48	7.74	279	45.00	98.55	-	99.55		54	4.15	149	11.46
54	8.71	333	53.71	99.55	-	100.55		42	3.23	191	14.69
58	9.35	391	63.06	100.55	-	101.55		77	5.92	268	20.62
43	6.94	434	70.00	101.55	-	102.55		77	5.92	345	26.54
45	7.26	479	77.26	102.55	-	103.55		93	7.15	438	33.69
38	6.13	517	83.39	103.55	-	104.55		93	7.15	531	40.85
24	3.87	541	87.26	104.55	-	105.55		105	8.08	636	48.92
33	5.32	574	92.58	105.55	-	106.55		90	6.92	726	55.85
18	2.90	592	95.48	106.55	-	107.55		94	7.23	820	63.08
10	1.61	602	97.10	107.55	-	108.55		86	6.62	906	69.69
6	0.97	608	98.06	108.55	-	109.55		76	5.85	982	75.54
1	0.16	609	98.23	109.55	-	110.55		52	4.00	1034	79.54
6	0.97	615	99.19	110.55	-	111.55		53	4.08	1087	83.62
1	0.16	616	99.35	111.55	-	112.55		59	4.54	1146	88.15
2	0.32	618	99.68	112.55	-	113.55		40	3.08	1186	91.23
1	0.16	619	99.84	113.55	-	114.55		37	2.85	1223	94.08
1	0.16	620	100.00	114.55	-	115.55		21	1.62	1244	95.69
				115.55	-	116.55		16	1.23	1260	96.92
				116.55	-	117.55		8	0.62	1268	97.54
				117.55	-	118.55		12	0.92	1280	98.46
				118.55	-	119.55		11	0.85	1291	99.31
				119.55	-	120.55		3	0.23	1294	99.54
				120.55	-	121.55		2	0.15	1296	99.69
				121.55	-	122.55		2	0.15	1298	99.85
				122.55	-	123.55		1	0.08	1299	99.92
				123.55	-	124.55		1	0.08	1300	100.00

(54) INTERPUPILLARY BREADTH

The distance between the two pupils is measured with a pupillometer.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
5.45	2.15	1ST	5.60	2.20
5.45	2.15	2ND	5.65	2.22
5.50	2.17	3RD	5.75	2.26
5.55	2.19	5TH	5.85	2.30
5.65	2.22	10TH	5.90	2.32
5.70	2.24	15TH	6.00	2.36
5.76	2.26	20TH	6.05	2.38
5.80	2.28	25TH	6.10	2.40
5.85	2.30	30TH	6.15	2.42
5.90	2.32	35TH	6.20	2.44
5.95	2.34	40TH	6.25	2.46
6.00	2.36	45TH	6.30	2.48
6.05	2.38	50TH	6.35	2.50
6.10	2.40	55TH	6.40	2.52
6.10	2.40	60TH	6.45	2.54
6.15	2.42	65TH	6.45	2.54
6.20	2.44	70TH	6.50	2.56
6.25	2.46	75TH	6.55	2.58
6.30	2.48	80TH	6.65	2.62
6.40	2.52	85TH	6.70	2.64
6.45	2.54	90TH	6.80	2.68
6.60	2.60	95TH	6.90	2.72
6.70	2.64	97TH	7.00	2.76
6.81	2.68	98TH	7.05	2.78
6.90	2.72	99TH	7.20	2.83

(54) INTERPUPILLARY BREADTH

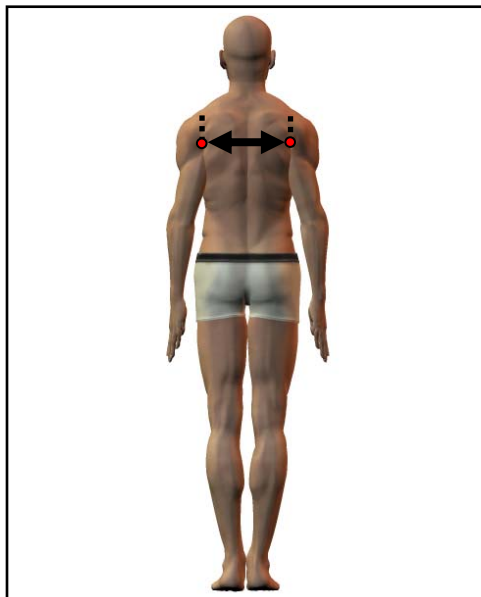
FEMALES		
CM		IN
6.05	MEAN	2.38
0.01	STD ERROR (MEAN)	0.01
0.32	STANDARD DEVIATION	0.13
0.01	STD ERROR (STD DEV)	0.00
5.25	MINIMUM	2.07
7.25	MAXIMUM	2.85
SKEWNESS		0.36
KURTOSIS		3.15
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
6.35	MEAN	2.50
0.01	STD ERROR (MEAN)	0.00
0.34	STANDARD DEVIATION	0.14
0.01	STD ERROR (STD DEV)	0.00
5.35	MINIMUM	2.11
7.75	MAXIMUM	3.05
SKEWNESS		0.22
KURTOSIS		3.17
COEFFICIENT OF VARIATION		5.4%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
3	0.48	3	0.48	5.25	-	5.35		3	0.23	3	0.23
2	0.32	5	0.81	5.35	-	5.45		2	0.15	5	0.38
18	2.90	23	3.71	5.45	-	5.55		9	0.69	14	1.08
29	4.68	52	8.39	5.55	-	5.65		24	1.85	38	2.92
47	7.58	99	15.97	5.65	-	5.75		24	1.85	62	4.77
59	9.52	158	25.48	5.75	-	5.85		73	5.62	135	10.38
72	11.61	230	37.10	5.85	-	5.95		89	6.85	224	17.23
75	12.10	305	49.19	5.95	-	6.05		118	9.08	342	26.31
75	12.10	380	61.29	6.05	-	6.15		134	10.31	476	36.62
66	10.65	446	71.94	6.15	-	6.25		149	11.46	625	48.08
59	9.52	505	81.45	6.25	-	6.35		149	11.46	774	59.54
42	6.77	547	88.23	6.35	-	6.45		144	11.08	918	70.62
26	4.19	573	92.42	6.45	-	6.55		117	9.00	1035	79.62
18	2.90	591	95.32	6.55	-	6.65		77	5.92	1112	85.54
13	2.10	604	97.42	6.65	-	6.75		66	5.08	1178	90.62
4	0.65	608	98.06	6.75	-	6.85		63	4.85	1241	95.46
7	1.13	615	99.19	6.85	-	6.95		28	2.15	1269	97.62
3	0.48	618	99.68	6.95	-	7.05		15	1.15	1284	98.77
1	0.16	619	99.84	7.05	-	7.15		7	0.54	1291	99.31
0	0.00	619	99.84	7.15	-	7.25		3	0.23	1294	99.54
1	0.16	620	100.00	7.25	-	7.35		2	0.15	1296	99.69
				7.35	-	7.45		1	0.08	1297	99.77
				7.45	-	7.55		1	0.08	1298	99.85
				7.55	-	7.65		1	0.08	1299	99.92
				7.65	-	7.75		1	0.08	1300	100.00
				7.75	-	7.85					

(55) INTERSCYE I

The distance across the back between the right and left posterior axillary fold landmarks is measured with a tape. The tape is held on the skin surface except where the tape spans the hollow of the back. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
30.06	11.84	1ST	34.60	13.62
31.18	12.27	2ND	35.50	13.98
31.80	12.52	3RD	36.10	14.21
32.41	12.76	5TH	36.81	14.49
33.00	12.99	10TH	38.00	14.96
33.70	13.27	15TH	39.00	15.35
34.50	13.58	20TH	39.50	15.55
34.80	13.70	25TH	40.10	15.79
35.20	13.86	30TH	40.50	15.94
35.54	13.99	35TH	41.00	16.14
36.00	14.17	40TH	41.60	16.38
36.30	14.29	45TH	42.00	16.54
36.65	14.43	50TH	42.45	16.71
37.00	14.57	55TH	43.00	16.93
37.30	14.69	60TH	43.26	17.03
37.70	14.84	65TH	43.70	17.20
38.20	15.04	70TH	44.20	17.40
38.60	15.20	75TH	44.70	17.60
39.18	15.42	80TH	45.20	17.80
39.80	15.67	85TH	45.70	17.99
40.29	15.87	90TH	46.59	18.35
41.50	16.34	95TH	47.99	18.90
42.37	16.68	97TH	48.80	19.21
43.00	16.93	98TH	49.20	19.37
43.40	17.09	99TH	50.00	19.69

(55) INTERSCYE I

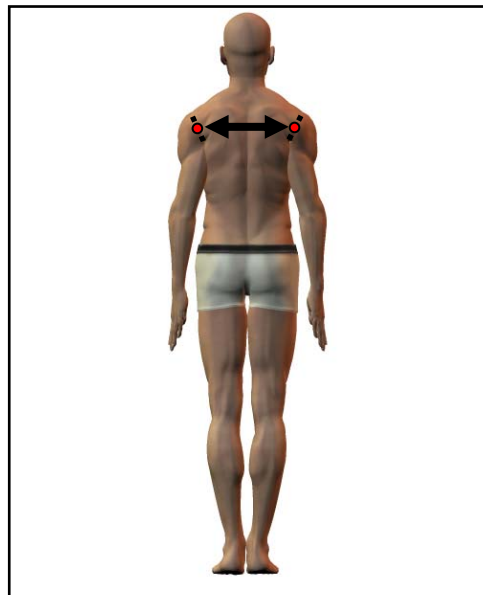
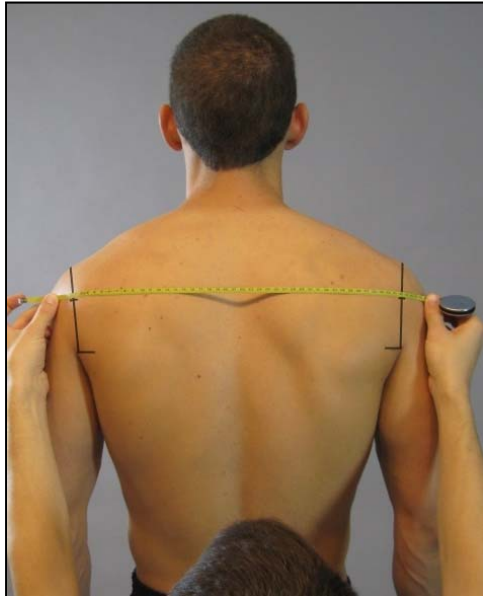
FEMALES		
<u>CM</u>		<u>IN</u>
36.74	MEAN	14.47
0.11	STD ERROR (MEAN)	0.04
2.82	STANDARD DEVIATION	1.11
0.08	STD ERROR (STD DEV)	0.03
28.50	MINIMUM	11.22
47.10	MAXIMUM	18.54
SKEWNESS		0.17
KURTOSIS		3.06
COEFFICIENT OF VARIATION		7.7%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
42.40	MEAN	16.69
0.09	STD ERROR (MEAN)	0.04
3.33	STANDARD DEVIATION	1.31
0.07	STD ERROR (STD DEV)	0.03
32.00	MINIMUM	12.60
53.50	MAXIMUM	21.06
SKEWNESS		-0.02
KURTOSIS		2.93
COEFFICIENT OF VARIATION		7.9%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	28.25	-	28.75					
0	0.00	1	0.16	28.75	-	29.25					
2	0.32	3	0.48	29.25	-	29.75					
3	0.48	6	0.97	29.75	-	30.25					
4	0.65	10	1.61	30.25	-	30.75					
2	0.32	12	1.94	30.75	-	31.25					
5	0.81	17	2.74	31.25	-	31.75					
10	1.61	27	4.35	31.75	-	32.25		1	0.08	1	0.08
16	2.58	43	6.94	32.25	-	32.75		1	0.08	2	0.15
27	4.35	70	11.29	32.75	-	33.25		1	0.08	3	0.23
25	4.03	95	15.32	33.25	-	33.75		2	0.15	5	0.38
21	3.39	116	18.71	33.75	-	34.25		6	0.46	11	0.85
36	5.81	152	24.52	34.25	-	34.75		4	0.31	15	1.15
38	6.13	190	30.65	34.75	-	35.25		8	0.62	23	1.77
38	6.13	228	36.77	35.25	-	35.75		9	0.69	32	2.46
48	7.74	276	44.52	35.75	-	36.25		12	0.92	44	3.38
44	7.10	320	51.61	36.25	-	36.75		17	1.31	61	4.69
45	7.26	365	58.87	36.75	-	37.25		20	1.54	81	6.23
39	6.29	404	65.16	37.25	-	37.75		30	2.31	111	8.54
33	5.32	437	70.48	37.75	-	38.25		33	2.54	144	11.08
37	5.97	474	76.45	38.25	-	38.75		29	2.23	173	13.31
27	4.35	501	80.81	38.75	-	39.25		43	3.31	216	16.62
24	3.87	525	84.68	39.25	-	39.75		61	4.69	277	21.31
33	5.32	558	90.00	39.75	-	40.25		69	5.31	346	26.62
16	2.58	574	92.58	40.25	-	40.75		66	5.08	412	31.69
12	1.94	586	94.52	40.75	-	41.25		70	5.38	482	37.08
7	1.13	593	95.65	41.25	-	41.75		58	4.46	540	41.54
7	1.13	600	96.77	41.75	-	42.25		86	6.62	626	48.15
7	1.13	607	97.90	42.25	-	42.75		69	5.31	695	53.46
5	0.81	612	98.71	42.75	-	43.25		85	6.54	780	60.00
3	0.48	615	99.19	43.25	-	43.75		71	5.46	851	65.46
3	0.48	618	99.68	43.75	-	44.25		68	5.23	919	70.69
0	0.00	618	99.68	44.25	-	44.75		62	4.77	981	75.46
0	0.00	618	99.68	44.75	-	45.25		68	5.23	1049	80.69
1	0.16	619	99.84	45.25	-	45.75		62	4.77	1111	85.46
0	0.00	619	99.84	45.75	-	46.25		43	3.31	1154	88.77
0	0.00	619	99.84	46.25	-	46.75		22	1.69	1176	90.46
1	0.16	620	100.00	46.75	-	47.25		19	1.46	1195	91.92
				47.25	-	47.75		34	2.62	1229	94.54
				47.75	-	48.25		20	1.54	1249	96.08
				48.25	-	48.75		12	0.92	1261	97.00
				48.75	-	49.25		16	1.23	1277	98.23
				49.25	-	49.75		9	0.69	1286	98.92
				49.75	-	50.25		6	0.46	1292	99.38
				50.25	-	50.75		2	0.15	1294	99.54
				50.75	-	51.25		2	0.15	1296	99.69
				51.25	-	51.75		0	0.00	1296	99.69
				51.75	-	52.25		2	0.15	1298	99.85
				52.25	-	52.75		1	0.08	1299	99.92
				52.75	-	53.25		0	0.00	1299	99.92
				53.25	-	53.75		1	0.08	1300	100.00

(56) INTERSCYE II

The distance across the back between the right and left midscye landmarks is measured with a tape. The tape is held on the skin surface except where it spans the hollow of the back. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
33.42	13.16	1ST	37.00	14.57
34.54	13.60	2ND	37.90	14.92
35.00	13.78	3RD	38.50	15.16
35.30	13.90	5TH	39.20	15.43
36.10	14.21	10TH	40.40	15.91
36.90	14.53	15TH	41.30	16.26
37.30	14.69	20TH	41.94	16.52
37.63	14.81	25TH	42.30	16.65
38.00	14.96	30TH	42.80	16.85
38.40	15.12	35TH	43.30	17.05
38.70	15.24	40TH	43.70	17.20
39.00	15.35	45TH	44.00	17.32
39.30	15.47	50TH	44.50	17.52
39.60	15.59	55TH	44.80	17.64
40.00	15.75	60TH	45.10	17.76
40.20	15.83	65TH	45.50	17.91
40.60	15.98	70TH	45.90	18.07
41.20	16.22	75TH	46.20	18.19
41.68	16.41	80TH	46.70	18.39
42.00	16.54	85TH	47.30	18.62
42.50	16.73	90TH	48.00	18.90
43.50	17.13	95TH	49.00	19.29
44.20	17.40	97TH	49.60	19.53
44.50	17.52	98TH	50.10	19.72
44.94	17.69	99TH	50.70	19.96

(56) INTERSCYE II

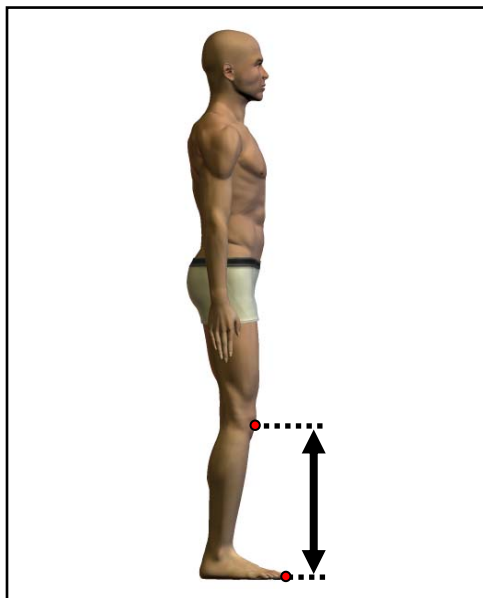
FEMALES		
CM		IN
39.38	MEAN	15.51
0.10	STD ERROR (MEAN)	0.04
2.48	STANDARD DEVIATION	0.98
0.07	STD ERROR (STD DEV)	0.03
32.00	MINIMUM	12.60
48.30	MAXIMUM	19.02
SKEWNESS		0.08
KURTOSIS		2.93
COEFFICIENT OF VARIATION		6.3%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
44.28	MEAN	17.43
0.08	STD ERROR (MEAN)	0.03
2.92	STANDARD DEVIATION	1.15
0.06	STD ERROR (STD DEV)	0.02
33.60	MINIMUM	13.23
52.50	MAXIMUM	20.67
SKEWNESS		-0.21
KURTOSIS		3.01
COEFFICIENT OF VARIATION		6.6%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	31.75	-	32.25					
1	0.16	2	0.32	32.25	-	32.75					
1	0.16	3	0.48	32.75	-	33.25					
4	0.65	7	1.13	33.25	-	33.75		1	0.08	1	0.08
3	0.48	10	1.61	33.75	-	34.25		0	0.00	1	0.08
4	0.65	14	2.26	34.25	-	34.75		0	0.00	1	0.08
16	2.58	30	4.84	34.75	-	35.25		2	0.15	3	0.23
15	2.42	45	7.26	35.25	-	35.75		1	0.08	4	0.31
20	3.23	65	10.48	35.75	-	36.25		2	0.15	6	0.46
22	3.55	87	14.03	36.25	-	36.75		3	0.23	9	0.69
31	5.00	118	19.03	36.75	-	37.25		7	0.54	16	1.23
47	7.58	165	26.61	37.25	-	37.75		9	0.69	25	1.92
43	6.94	208	33.55	37.75	-	38.25		6	0.46	31	2.38
45	7.26	253	40.81	38.25	-	38.75		14	1.08	45	3.46
53	8.55	306	49.35	38.75	-	39.25		24	1.84	69	5.30
44	7.10	350	56.45	39.25	-	39.75		25	1.92	94	7.23
55	8.87	405	65.32	39.75	-	40.25		25	1.92	119	9.15
33	5.32	438	70.65	40.25	-	40.75		32	2.46	151	11.61
35	5.65	473	76.29	40.75	-	41.25		38	2.92	189	14.53
32	5.16	505	81.45	41.25	-	41.75		51	3.92	240	18.45
42	6.77	547	88.23	41.75	-	42.25		81	6.23	321	24.67
21	3.39	568	91.61	42.25	-	42.75		63	4.84	384	29.52
12	1.94	580	93.55	42.75	-	43.25		69	5.30	453	34.82
15	2.42	595	95.97	43.25	-	43.75		80	6.15	533	40.97
8	1.29	603	97.26	43.75	-	44.25		89	6.84	622	47.81
11	1.77	614	99.03	44.25	-	44.75		86	6.61	708	54.42
2	0.32	616	99.35	44.75	-	45.25		95	7.30	803	61.72
1	0.16	617	99.52	45.25	-	45.75		90	6.92	893	68.64
0	0.00	617	99.52	45.75	-	46.25		94	7.23	987	75.86
2	0.32	619	99.84	46.25	-	46.75		56	4.30	1043	80.17
0	0.00	619	99.84	46.75	-	47.25		62	4.77	1105	84.93
0	0.00	619	99.84	47.25	-	47.75		47	3.61	1152	88.55
0	0.00	619	99.84	47.75	-	48.25		35	2.69	1187	91.24
1	0.16	620	100.00	48.25	-	48.75		42	3.23	1229	94.47
				48.75	-	49.25		16	1.23	1245	95.70
				49.25	-	49.75		22	1.69	1267	97.39
				49.75	-	50.25		13	1.00	1280	98.39
				50.25	-	50.75		9	0.69	1289	99.08
				50.75	-	51.25		8	0.61	1297	99.69
				51.25	-	51.75		2	0.15	1299	99.85
				51.75	-	52.25		1	0.08	1300	99.92
				52.25	-	52.75		1	0.08	1301	100.00

(57) KNEE HEIGHT, MIDPATELLA

The vertical distance between a standing surface and the midpatella landmark is measured with an anthropometer. The participant stands erect with the heels together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
40.04	15.77	1ST	43.70	17.20
40.34	15.89	2ND	44.20	17.40
40.83	16.07	3RD	44.50	17.52
41.21	16.22	5TH	45.20	17.80
42.20	16.61	10TH	46.00	18.11
42.80	16.85	15TH	46.60	18.35
43.12	16.98	20TH	47.20	18.58
43.50	17.13	25TH	47.60	18.74
43.80	17.24	30TH	48.06	18.92
44.30	17.44	35TH	48.40	19.06
44.60	17.56	40TH	48.80	19.21
45.00	17.72	45TH	49.10	19.33
45.30	17.83	50TH	49.30	19.41
45.60	17.95	55TH	49.70	19.57
45.90	18.07	60TH	50.10	19.72
46.20	18.19	65TH	50.40	19.84
46.50	18.31	70TH	50.80	20.00
46.80	18.43	75TH	51.30	20.20
47.20	18.58	80TH	52.00	20.47
47.70	18.78	85TH	52.50	20.67
48.20	18.98	90TH	53.20	20.94
49.20	19.37	95TH	54.30	21.38
49.87	19.64	97TH	55.00	21.65
50.47	19.87	98TH	55.60	21.89
51.38	20.23	99TH	56.70	22.32

(57) KNEE HEIGHT, MIDPATELLA

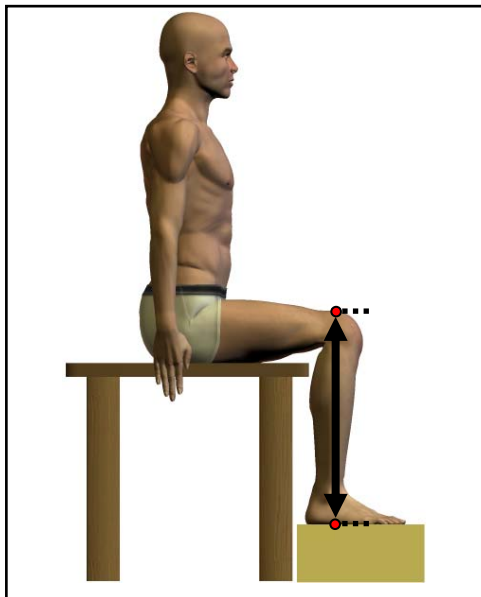
FEMALES		
CM		IN
45.23	MEAN	17.81
0.10	STD ERROR (MEAN)	0.04
2.40	STANDARD DEVIATION	0.95
0.07	STD ERROR (STD DEV)	0.03
38.60	MINIMUM	15.20
53.50	MAXIMUM	21.06
SKEWNESS		0.14
KURTOSIS		3.09
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
49.53	MEAN	19.50
0.08	STD ERROR (MEAN)	0.03
2.79	STANDARD DEVIATION	1.10
0.05	STD ERROR (STD DEV)	0.02
40.50	MINIMUM	15.94
58.30	MAXIMUM	22.95
SKEWNESS		0.21
KURTOSIS		2.96
COEFFICIENT OF VARIATION		5.6%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	38.25	-	38.75					
1	0.16	2	0.32	38.75	-	39.25					
3	0.48	5	0.81	39.25	-	39.75					
2	0.32	7	1.13	39.75	-	40.25					
11	1.77	18	2.90	40.25	-	40.75		1	0.08	1	0.08
13	2.10	31	5.00	40.75	-	41.25		0	0.00	1	0.08
12	1.94	43	6.94	41.25	-	41.75		2	0.15	3	0.23
21	3.39	64	10.32	41.75	-	42.25		1	0.08	4	0.31
28	4.52	92	14.84	42.25	-	42.75		1	0.08	5	0.38
42	6.77	134	21.61	42.75	-	43.25		4	0.31	9	0.69
44	7.10	178	28.71	43.25	-	43.75		5	0.38	14	1.08
32	5.16	210	33.87	43.75	-	44.25		14	1.08	28	2.15
53	8.55	263	42.42	44.25	-	44.75		18	1.38	46	3.54
37	5.97	300	48.39	44.75	-	45.25		22	1.69	68	5.23
59	9.52	359	57.90	45.25	-	45.75		34	2.61	102	7.84
46	7.42	405	65.32	45.75	-	46.25		54	4.15	156	11.99
55	8.87	460	74.19	46.25	-	46.75		55	4.23	211	16.22
40	6.45	500	80.65	46.75	-	47.25		65	5.00	276	21.21
36	5.81	536	86.45	47.25	-	47.75		64	4.92	340	26.13
24	3.87	560	90.32	47.75	-	48.25		83	6.38	423	32.51
15	2.42	575	92.74	48.25	-	48.75		94	7.23	517	39.74
18	2.90	593	95.65	48.75	-	49.25		114	8.76	631	48.50
8	1.29	601	96.94	49.25	-	49.75		96	7.38	727	55.88
6	0.97	607	97.90	49.75	-	50.25		86	6.61	813	62.49
3	0.48	610	98.39	50.25	-	50.75		92	7.07	905	69.56
3	0.48	613	98.87	50.75	-	51.25		63	4.84	968	74.40
4	0.65	617	99.52	51.25	-	51.75		43	3.31	1011	77.71
0	0.00	617	99.52	51.75	-	52.25		67	5.15	1078	82.86
0	0.00	617	99.52	52.25	-	52.75		45	3.46	1123	86.32
2	0.32	619	99.84	52.75	-	53.25		52	4.00	1175	90.32
1	0.16	620	100.00	53.25	-	53.75		29	2.23	1204	92.54
				53.75	-	54.25		30	2.31	1234	94.85
				54.25	-	54.75		23	1.77	1257	96.62
				54.75	-	55.25		11	0.85	1268	97.46
				55.25	-	55.75		13	1.00	1281	98.46
				55.75	-	56.25		2	0.15	1283	98.62
				56.25	-	56.75		8	0.61	1291	99.23
				56.75	-	57.25		3	0.23	1294	99.46
				57.25	-	57.75		5	0.38	1299	99.85
				57.75	-	58.25		1	0.08	1300	99.92
				58.25	-	58.75		1	0.08	1301	100.00

(58) KNEE HEIGHT, SITTING

The vertical distance between a footrest surface and the suprapatella landmark is measured with an anthropometer. The participant sits with the thighs parallel, the knees flexed 90°, and the feet in line with the thighs.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
45.72	18.00	1ST	49.50	19.49
46.10	18.15	2ND	50.00	19.69
46.36	18.25	3RD	50.40	19.84
46.80	18.43	5TH	50.90	20.04
47.40	18.66	10TH	51.80	20.39
48.00	18.90	15TH	52.50	20.67
48.50	19.09	20TH	53.00	20.87
48.90	19.25	25TH	53.50	21.06
49.30	19.41	30TH	53.80	21.18
49.70	19.57	35TH	54.27	21.37
50.10	19.72	40TH	54.70	21.54
50.50	19.88	45TH	55.00	21.65
50.70	19.96	50TH	55.40	21.81
51.10	20.12	55TH	55.61	21.89
51.40	20.24	60TH	56.00	22.05
51.70	20.35	65TH	56.50	22.24
52.00	20.47	70TH	56.80	22.36
52.40	20.63	75TH	57.30	22.56
52.80	20.79	80TH	57.76	22.74
53.30	20.98	85TH	58.37	22.98
53.70	21.14	90TH	59.00	23.23
54.60	21.50	95TH	60.20	23.70
55.48	21.84	97TH	60.90	23.98
56.22	22.14	98TH	61.70	24.29
57.26	22.54	99TH	62.30	24.53

(58) KNEE HEIGHT, SITTING

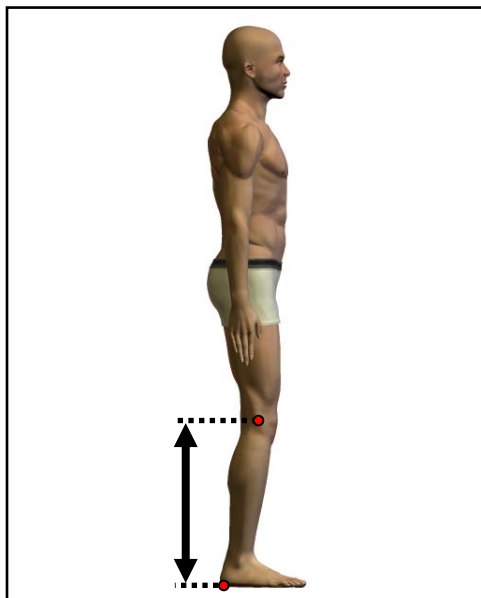
FEMALES		
CM		IN
50.72	MEAN	19.97
0.10	STD ERROR (MEAN)	0.04
2.47	STANDARD DEVIATION	0.97
0.07	STD ERROR (STD DEV)	0.03
44.30	MINIMUM	17.44
60.20	MAXIMUM	23.70
SKEWNESS		0.23
KURTOSIS		3.10
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		619

MALES		
CM		IN
55.40	MEAN	21.81
0.08	STD ERROR (MEAN)	0.03
2.81	STANDARD DEVIATION	1.11
0.06	STD ERROR (STD DEV)	0.02
46.70	MINIMUM	18.39
64.20	MAXIMUM	25.28
SKEWNESS		0.16
KURTOSIS		2.93
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	44.25	-	44.75					
2	0.32	3	0.48	44.75	-	45.25					
3	0.48	6	0.97	45.25	-	45.75					
9	1.45	15	2.42	45.75	-	46.25					
14	2.26	29	4.68	46.25	-	46.75		1	0.08	1	0.08
23	3.72	52	8.40	46.75	-	47.25		1	0.08	2	0.15
27	4.36	79	12.76	47.25	-	47.75		1	0.08	3	0.23
28	4.52	107	17.29	47.75	-	48.25		2	0.15	5	0.38
37	5.98	144	23.26	48.25	-	48.75		1	0.08	6	0.46
39	6.30	183	29.56	48.75	-	49.25		4	0.31	10	0.77
35	5.65	218	35.22	49.25	-	49.75		11	0.85	21	1.61
37	5.98	255	41.20	49.75	-	50.25		11	0.85	32	2.46
55	8.89	310	50.08	50.25	-	50.75		27	2.08	59	4.53
48	7.75	358	57.84	50.75	-	51.25		30	2.31	89	6.84
52	8.40	410	66.24	51.25	-	51.75		37	2.84	126	9.68
42	6.79	452	73.02	51.75	-	52.25		49	3.77	175	13.45
39	6.30	491	79.32	52.25	-	52.75		56	4.30	231	17.76
34	5.49	525	84.81	52.75	-	53.25		66	5.07	297	22.83
33	5.33	558	90.15	53.25	-	53.75		80	6.15	377	28.98
19	3.07	577	93.21	53.75	-	54.25		78	6.00	455	34.97
15	2.42	592	95.64	54.25	-	54.75		80	6.15	535	41.12
6	0.97	598	96.61	54.75	-	55.25		96	7.38	631	48.50
5	0.81	603	97.42	55.25	-	55.75		107	8.22	738	56.73
4	0.65	607	98.06	55.75	-	56.25		84	6.46	822	63.18
5	0.81	612	98.87	56.25	-	56.75		69	5.30	891	68.49
1	0.16	613	99.03	56.75	-	57.25		81	6.23	972	74.71
2	0.32	615	99.35	57.25	-	57.75		69	5.30	1041	80.02
1	0.16	616	99.52	57.75	-	58.25		49	3.77	1090	83.78
1	0.16	617	99.68	58.25	-	58.75		54	4.15	1144	87.93
1	0.16	618	99.84	58.75	-	59.25		42	3.23	1186	91.16
0	0.00	618	99.84	59.25	-	59.75		26	2.00	1212	93.16
1	0.16	619	100.00	59.75	-	60.25		29	2.23	1241	95.39
				60.25	-	60.75		19	1.46	1260	96.85
				60.75	-	61.25		10	0.77	1270	97.62
				61.25	-	61.75		9	0.69	1279	98.31
				61.75	-	62.25		8	0.61	1287	98.92
				62.25	-	62.75		6	0.46	1293	99.39
				62.75	-	63.25		3	0.23	1296	99.62
				63.25	-	63.75		1	0.08	1297	99.69
				63.75	-	64.25		4	0.31	1301	100.00

(59) LATERAL FEMORAL EPICONDYLE HEIGHT

The vertical distance between a standing surface and the standing lateral femoral epicondyle landmark is measured with an anthropometer. The participant stands erect with the heels together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
40.50	15.94	1ST	44.10	17.36
40.80	16.06	2ND	44.40	17.48
41.20	16.22	3RD	44.90	17.68
41.60	16.38	5TH	45.30	17.83
42.31	16.65	10TH	45.92	18.08
42.90	16.89	15TH	46.70	18.39
43.30	17.05	20TH	47.20	18.58
43.60	17.17	25TH	47.55	18.72
43.90	17.28	30TH	48.00	18.90
44.40	17.48	35TH	48.30	19.02
44.84	17.66	40TH	48.60	19.13
45.10	17.76	45TH	48.90	19.25
45.40	17.87	50TH	49.30	19.41
45.70	17.99	55TH	49.60	19.53
46.00	18.11	60TH	49.90	19.65
46.40	18.27	65TH	50.20	19.76
46.70	18.39	70TH	50.70	19.96
47.00	18.50	75TH	51.10	20.12
47.40	18.66	80TH	51.60	20.31
47.90	18.86	85TH	52.20	20.55
48.60	19.13	90TH	52.80	20.79
49.40	19.45	95TH	53.79	21.18
50.20	19.76	97TH	54.60	21.50
50.72	19.97	98TH	55.00	21.65
51.56	20.30	99TH	55.70	21.93

(59) LATERAL FEMORAL EPICONDYLE HEIGHT

FEMALES		
CM		IN
45.44	MEAN	17.89
0.10	STD ERROR (MEAN)	0.04
2.41	STANDARD DEVIATION	0.95
0.07	STD ERROR (STD DEV)	0.03
38.90	MINIMUM	15.31
54.40	MAXIMUM	21.42
SKEWNESS		0.25
KURTOSIS		3.02
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
49.37	MEAN	19.44
0.07	STD ERROR (MEAN)	0.03
2.60	STANDARD DEVIATION	1.03
0.05	STD ERROR (STD DEV)	0.02
41.50	MINIMUM	16.34
57.30	MAXIMUM	22.56
SKEWNESS		0.18
KURTOSIS		2.89
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	38.75	-	39.25					
0	0.00	1	0.16	39.25	-	39.75					
2	0.32	3	0.48	39.75	-	40.25					
7	1.13	10	1.61	40.25	-	40.75					
9	1.45	19	3.06	40.75	-	41.25					
17	2.74	36	5.81	41.25	-	41.75		1	0.08	1	0.08
20	3.23	56	9.03	41.75	-	42.25		2	0.15	3	0.23
27	4.35	83	13.39	42.25	-	42.75		3	0.23	6	0.46
33	5.32	116	18.71	42.75	-	43.25		1	0.08	7	0.54
49	7.90	165	26.61	43.25	-	43.75		3	0.23	10	0.77
41	6.61	206	33.23	43.75	-	44.25		10	0.77	20	1.54
33	5.32	239	38.55	44.25	-	44.75		16	1.23	36	2.77
54	8.71	293	47.26	44.75	-	45.25		28	2.15	64	4.92
54	8.71	347	55.97	45.25	-	45.75		50	3.84	114	8.76
47	7.58	394	63.55	45.75	-	46.25		35	2.69	149	11.45
46	7.42	440	70.97	46.25	-	46.75		53	4.07	202	15.53
40	6.45	480	77.42	46.75	-	47.25		67	5.15	269	20.68
40	6.45	520	83.87	47.25	-	47.75		89	6.84	358	27.52
23	3.71	543	87.58	47.75	-	48.25		84	6.46	442	33.97
23	3.71	566	91.29	48.25	-	48.75		110	8.46	552	42.43
18	2.90	584	94.19	48.75	-	49.25		90	6.92	642	49.35
12	1.94	596	96.13	49.25	-	49.75		116	8.92	758	58.26
7	1.13	603	97.26	49.75	-	50.25		90	6.92	848	65.18
5	0.81	608	98.06	50.25	-	50.75		76	5.84	924	71.02
3	0.48	611	98.55	50.75	-	51.25		65	5.00	989	76.02
5	0.81	616	99.35	51.25	-	51.75		76	5.84	1065	81.86
1	0.16	617	99.52	51.75	-	52.25		47	3.61	1112	85.47
1	0.16	618	99.68	52.25	-	52.75		54	4.15	1166	89.62
0	0.00	618	99.68	52.75	-	53.25		39	3.00	1205	92.62
1	0.16	619	99.84	53.25	-	53.75		31	2.38	1236	95.00
0	0.00	619	99.84	53.75	-	54.25		18	1.38	1254	96.39
1	0.16	620	100.00	54.25	-	54.75		11	0.85	1265	97.23
				54.75	-	55.25		14	1.08	1279	98.31
				55.25	-	55.75		10	0.77	1289	99.08
				55.75	-	56.25		4	0.31	1293	99.39
				56.25	-	56.75		4	0.31	1297	99.69
				56.75	-	57.25		2	0.15	1299	99.85
				57.25	-	57.75		2	0.15	1301	100.00

(60) LATERAL MALLEOLUS HEIGHT

The vertical distance between a standing surface and the lateral malleolus landmark is measured with a modified height gauge. The participant stands erect with the heels together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
4.20	1.65	1ST	5.30	2.09
4.44	1.75	2ND	5.40	2.13
4.60	1.81	3RD	5.50	2.17
4.80	1.89	5TH	5.70	2.24
5.00	1.97	10TH	6.00	2.36
5.20	2.05	15TH	6.20	2.44
5.40	2.13	20TH	6.30	2.48
5.60	2.20	25TH	6.50	2.56
5.70	2.24	30TH	6.60	2.60
5.80	2.28	35TH	6.70	2.64
5.90	2.32	40TH	6.80	2.68
6.00	2.36	45TH	6.90	2.72
6.10	2.40	50TH	7.00	2.76
6.20	2.44	55TH	7.10	2.80
6.20	2.44	60TH	7.20	2.83
6.30	2.48	65TH	7.30	2.87
6.40	2.52	70TH	7.30	2.87
6.50	2.56	75TH	7.40	2.91
6.60	2.60	80TH	7.50	2.95
6.70	2.64	85TH	7.70	3.03
6.80	2.68	90TH	7.80	3.07
7.10	2.80	95TH	8.00	3.15
7.24	2.84	97TH	8.20	3.23
7.30	2.87	98TH	8.30	3.27
7.40	2.91	99TH	8.50	3.35

(60) LATERAL MALLEOLUS HEIGHT

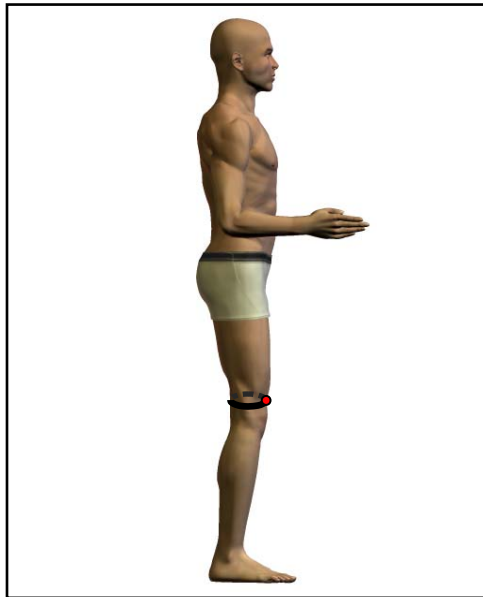
FEMALES		
CM		IN
6.00	MEAN	2.36
0.03	STD ERROR (MEAN)	0.01
0.70	STANDARD DEVIATION	0.28
0.02	STD ERROR (STD DEV)	0.01
3.70	MINIMUM	1.46
7.90	MAXIMUM	3.11
SKEWNESS		-0.37
KURTOSIS		3.04
COEFFICIENT OF VARIATION		11.7%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
6.94	MEAN	2.73
0.02	STD ERROR (MEAN)	0.01
0.70	STANDARD DEVIATION	0.28
0.01	STD ERROR (STD DEV)	0.01
4.50	MINIMUM	1.77
9.50	MAXIMUM	3.74
SKEWNESS		-0.26
KURTOSIS		3.06
COEFFICIENT OF VARIATION		10.1%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES		MALES			
E	FPct	CumF	CumFPct	CM		E	FPct	CumF	CumFPct
1	0.16	1	0.16	3.55	-	3.75			
3	0.48	4	0.65	3.75	-	3.95			
1	0.16	5	0.81	3.95	-	4.15			
2	0.32	7	1.13	4.15	-	4.35			
9	1.45	16	2.58	4.35	-	4.55	1	0.08	0.08
14	2.26	30	4.84	4.55	-	4.75	2	0.15	0.23
24	3.87	54	8.71	4.75	-	4.95	2	0.15	0.38
29	4.68	83	13.39	4.95	-	5.15	2	0.15	0.54
28	4.52	111	17.90	5.15	-	5.35	17	1.31	1.84
36	5.81	147	23.71	5.35	-	5.55	21	1.61	3.46
59	9.52	206	33.23	5.55	-	5.75	32	2.46	5.92
58	9.35	264	42.58	5.75	-	5.95	42	3.23	9.15
68	10.97	332	53.55	5.95	-	6.15	54	4.15	13.30
89	14.35	421	67.90	6.15	-	6.35	90	6.92	20.22
70	11.29	491	79.19	6.35	-	6.55	95	7.30	27.52
50	8.06	541	87.26	6.55	-	6.75	126	9.68	37.20
32	5.16	573	92.42	6.75	-	6.95	141	10.84	48.04
22	3.55	595	95.97	6.95	-	7.15	139	10.68	58.72
17	2.74	612	98.71	7.15	-	7.35	178	13.68	72.41
4	0.65	616	99.35	7.35	-	7.55	116	8.92	81.32
2	0.32	618	99.68	7.55	-	7.75	88	6.76	88.09
2	0.32	620	100.00	7.75	-	7.95	74	5.69	93.77
				7.95	-	8.15	39	3.00	96.77
				8.15	-	8.35	24	1.84	98.62
				8.35	-	8.55	9	0.69	99.31
				8.55	-	8.75	6	0.46	99.77
				8.75	-	8.95	2	0.15	99.92
				8.95	-	9.15	0	0.00	99.92
				9.15	-	9.35	0	0.00	99.92
				9.35	-	9.55	1	0.08	100.00

(61) LOWER THIGH CIRCUMFERENCE

The horizontal circumference of the right thigh at the level of the suprapatella landmark is measured with a tape. The participant stands erect with the feet about 10 cm apart and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
32.74	12.89	1ST	33.60	13.23
33.54	13.21	2ND	34.21	13.46
33.96	13.38	3RD	34.90	13.74
34.61	13.62	5TH	35.61	14.02
35.30	13.90	10TH	36.60	14.41
35.60	14.02	15TH	37.30	14.69
36.22	14.26	20TH	37.70	14.84
36.70	14.45	25TH	38.20	15.04
37.10	14.61	30TH	38.66	15.22
37.50	14.76	35TH	39.10	15.39
37.80	14.88	40TH	39.50	15.55
38.10	15.00	45TH	39.80	15.67
38.30	15.08	50TH	40.20	15.83
38.70	15.24	55TH	40.50	15.94
39.00	15.35	60TH	41.00	16.14
39.40	15.51	65TH	41.40	16.30
39.70	15.63	70TH	41.80	16.46
39.90	15.71	75TH	42.30	16.65
40.30	15.87	80TH	42.70	16.81
41.00	16.14	85TH	43.40	17.09
41.50	16.34	90TH	44.30	17.44
42.80	16.85	95TH	45.30	17.83
43.84	17.25	97TH	45.90	18.07
44.85	17.66	98TH	46.40	18.27
45.54	17.92	99TH	47.30	18.62

(61) LOWER THIGH CIRCUMFERENCE

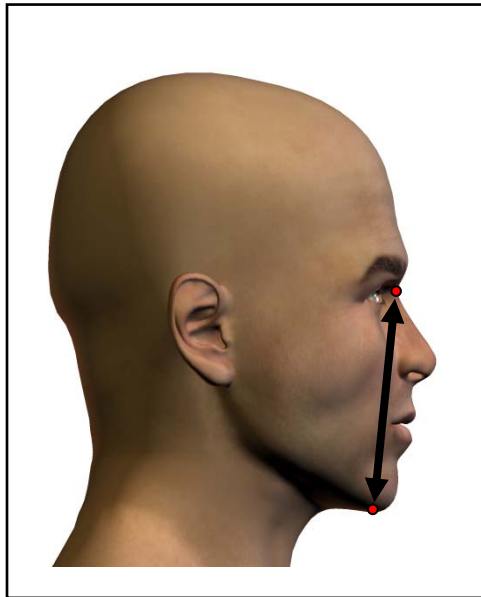
FEMALES		
CM		IN
38.45	MEAN	15.14
0.11	STD ERROR (MEAN)	0.04
2.64	STANDARD DEVIATION	1.04
0.07	STD ERROR (STD DEV)	0.03
30.70	MINIMUM	12.09
53.00	MAXIMUM	20.87
SKEWNESS		0.58
KURTOSIS		4.90
COEFFICIENT OF VARIATION		6.9%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
40.28	MEAN	15.86
0.08	STD ERROR (MEAN)	0.03
2.97	STANDARD DEVIATION	1.17
0.06	STD ERROR (STD DEV)	0.02
31.40	MINIMUM	12.36
51.00	MAXIMUM	20.08
SKEWNESS		0.15
KURTOSIS		3.04
COEFFICIENT OF VARIATION		7.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM		CM		E	FPct	CumF	CumFPct
1	0.16	1	0.16	30.25	-	30.75					
1	0.16	2	0.32	30.75	-	31.25					
1	0.16	3	0.48	31.25	-	31.75		1	0.08	1	0.08
0	0.00	3	0.48	31.75	-	32.25		2	0.15	3	0.23
3	0.48	6	0.97	32.25	-	32.75		2	0.15	5	0.38
3	0.48	9	1.45	32.75	-	33.25		5	0.38	10	0.77
6	0.97	15	2.42	33.25	-	33.75		7	0.54	17	1.31
12	1.94	27	4.35	33.75	-	34.25		9	0.69	26	2.00
6	0.97	33	5.32	34.25	-	34.75		7	0.54	33	2.54
28	4.52	61	9.84	34.75	-	35.25		18	1.38	51	3.92
36	5.81	97	15.65	35.25	-	35.75		17	1.31	68	5.23
27	4.35	124	20.00	35.75	-	36.25		41	3.15	109	8.38
33	5.32	157	25.32	36.25	-	36.75		34	2.61	143	10.99
40	6.45	197	31.77	36.75	-	37.25		49	3.77	192	14.76
44	7.10	241	38.87	37.25	-	37.75		70	5.38	262	20.14
57	9.19	298	48.06	37.75	-	38.25		73	5.61	335	25.75
50	8.06	348	56.13	38.25	-	38.75		70	5.38	405	31.13
42	6.77	390	62.90	38.75	-	39.25		75	5.76	480	36.89
46	7.42	436	70.32	39.25	-	39.75		95	7.30	575	44.20
53	8.55	489	78.87	39.75	-	40.25		93	7.15	668	51.35
25	4.03	514	82.90	40.25	-	40.75		85	6.53	753	57.88
27	4.35	541	87.26	40.75	-	41.25		70	5.38	823	63.26
22	3.55	563	90.81	41.25	-	41.75		87	6.69	910	69.95
14	2.26	577	93.06	41.75	-	42.25		62	4.77	972	74.71
11	1.77	588	94.84	42.25	-	42.75		75	5.76	1047	80.48
7	1.13	595	95.97	42.75	-	43.25		50	3.84	1097	84.32
5	0.81	600	96.77	43.25	-	43.75		40	3.07	1137	87.39
6	0.97	606	97.74	43.75	-	44.25		32	2.46	1169	89.85
2	0.32	608	98.06	44.25	-	44.75		31	2.38	1200	92.24
2	0.32	610	98.39	44.75	-	45.25		35	2.69	1235	94.93
6	0.97	616	99.35	45.25	-	45.75		21	1.61	1256	96.54
0	0.00	616	99.35	45.75	-	46.25		17	1.31	1273	97.85
1	0.16	617	99.52	46.25	-	46.75		8	0.61	1281	98.46
0	0.00	617	99.52	46.75	-	47.25		5	0.38	1286	98.85
1	0.16	618	99.68	47.25	-	47.75		7	0.54	1293	99.39
0	0.00	618	99.68	47.75	-	48.25		1	0.08	1294	99.46
0	0.00	618	99.68	48.25	-	48.75		1	0.08	1295	99.54
0	0.00	618	99.68	48.75	-	49.25		2	0.15	1297	99.69
0	0.00	618	99.68	49.25	-	49.75		0	0.00	1297	99.69
1	0.16	619	99.84	49.75	-	50.25		2	0.15	1299	99.85
0	0.00	619	99.84	50.25	-	50.75		1	0.08	1300	99.92
0	0.00	619	99.84	50.75	-	51.25		1	0.08	1301	100.00
0	0.00	619	99.84	51.25	-	51.75					
0	0.00	619	99.84	51.75	-	52.25					
0	0.00	619	99.84	52.25	-	52.75					
1	0.16	620	100.00	52.75	-	53.25					

(62) MENTON-SELLION LENGTH

The distance between the menton landmark and the sellion landmark is measured with a sliding caliper. The teeth are lightly occluded.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
10.20	4.02	1ST	10.90	4.29
10.30	4.06	2ND	11.00	4.33
10.40	4.09	3RD	11.10	4.37
10.50	4.13	5TH	11.40	4.49
10.70	4.21	10TH	11.60	4.57
10.90	4.29	15TH	11.70	4.61
11.00	4.33	20TH	11.84	4.67
11.10	4.37	25TH	12.00	4.72
11.20	4.41	30TH	12.10	4.76
11.30	4.45	35TH	12.20	4.80
11.30	4.45	40TH	12.20	4.80
11.40	4.49	45TH	12.30	4.84
11.50	4.53	50TH	12.40	4.88
11.60	4.57	55TH	12.50	4.92
11.70	4.61	60TH	12.50	4.92
11.80	4.65	65TH	12.60	4.96
11.90	4.69	70TH	12.70	5.00
12.00	4.72	75TH	12.80	5.04
12.10	4.76	80TH	12.90	5.08
12.20	4.80	85TH	13.10	5.16
12.40	4.88	90TH	13.30	5.24
12.70	5.00	95TH	13.50	5.31
12.90	5.08	97TH	13.70	5.39
13.00	5.12	98TH	13.80	5.43
13.10	5.16	99TH	13.90	5.47

(62) MENTON-SELLION LENGTH

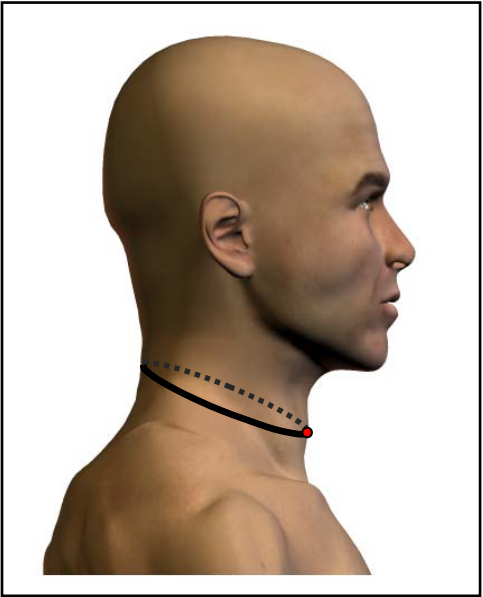
FEMALES		
CM		IN
11.53	MEAN	4.54
0.03	STD ERROR (MEAN)	0.01
0.64	STANDARD DEVIATION	0.25
0.02	STD ERROR (STD DEV)	0.01
10.00	MINIMUM	3.94
13.60	MAXIMUM	5.35
SKEWNESS		0.24
KURTOSIS		2.82
COEFFICIENT OF VARIATION		5.6%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
12.40	MEAN	4.88
0.02	STD ERROR (MEAN)	0.01
0.66	STANDARD DEVIATION	0.26
0.01	STD ERROR (STD DEV)	0.01
10.60	MINIMUM	4.17
15.10	MAXIMUM	5.94
SKEWNESS		0.16
KURTOSIS		3.25
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
F	FPct	CumF	CumFPct		CM			F	FPct	CumF	CumFPct
3	0.48	3	0.48	9.95	-	10.05					
2	0.32	5	0.81	10.05	-	10.15					
5	0.81	10	1.61	10.15	-	10.25					
5	0.81	15	2.42	10.25	-	10.35					
10	1.61	25	4.03	10.35	-	10.45					
10	1.61	35	5.65	10.45	-	10.55					
7	1.13	42	6.77	10.55	-	10.65		3	0.23	3	0.23
27	4.35	69	11.13	10.65	-	10.75		1	0.08	4	0.31
23	3.71	92	14.84	10.75	-	10.85		7	0.54	11	0.85
29	4.68	121	19.52	10.85	-	10.95		9	0.69	20	1.54
27	4.35	148	23.87	10.95	-	11.05		10	0.77	30	2.31
28	4.52	176	28.39	11.05	-	11.15		10	0.77	40	3.07
40	6.45	216	34.84	11.15	-	11.25		10	0.77	50	3.84
40	6.45	256	41.29	11.25	-	11.35		14	1.08	64	4.92
38	6.13	294	47.42	11.35	-	11.45		21	1.61	85	6.53
33	5.32	327	52.74	11.45	-	11.55		35	2.69	120	9.22
34	5.48	361	58.23	11.55	-	11.65		36	2.77	156	11.99
30	4.84	391	63.06	11.65	-	11.75		47	3.61	203	15.60
36	5.81	427	68.87	11.75	-	11.85		57	4.38	260	19.98
36	5.81	463	74.68	11.85	-	11.95		59	4.53	319	24.52
30	4.84	493	79.52	11.95	-	12.05		66	5.07	385	29.59
27	4.35	520	83.87	12.05	-	12.15		57	4.38	442	33.97
20	3.23	540	87.10	12.15	-	12.25		100	7.69	542	41.66
14	2.26	554	89.35	12.25	-	12.35		80	6.15	622	47.81
14	2.26	568	91.61	12.35	-	12.45		85	6.53	707	54.34
11	1.77	579	93.39	12.45	-	12.55		84	6.46	791	60.80
8	1.29	587	94.68	12.55	-	12.65		69	5.30	860	66.10
5	0.81	592	95.48	12.65	-	12.75		66	5.07	926	71.18
7	1.13	599	96.61	12.75	-	12.85		66	5.07	992	76.25
8	1.29	607	97.90	12.85	-	12.95		59	4.53	1051	80.78
4	0.65	611	98.55	12.95	-	13.05		45	3.46	1096	84.24
5	0.81	616	99.35	13.05	-	13.15		32	2.46	1128	86.70
3	0.48	619	99.84	13.15	-	13.25		37	2.84	1165	89.55
0	0.00	619	99.84	13.25	-	13.35		41	3.15	1206	92.70
0	0.00	619	99.84	13.35	-	13.45		23	1.77	1229	94.47
0	0.00	619	99.84	13.45	-	13.55		13	1.00	1242	95.47
1	0.16	620	100.00	13.55	-	13.65		13	1.00	1255	96.46
				13.65	-	13.75		15	1.15	1270	97.62
				13.75	-	13.85		15	1.15	1285	98.77
				13.85	-	13.95		5	0.38	1290	99.15
				13.95	-	14.05		2	0.15	1292	99.31
				14.05	-	14.15		1	0.08	1293	99.39
				14.15	-	14.25		1	0.08	1294	99.46
				14.25	-	14.35		1	0.08	1295	99.54
				14.35	-	14.45		2	0.15	1297	99.69
				14.45	-	14.55		2	0.15	1299	99.85
				14.55	-	14.65		0	0.00	1299	99.85
				14.65	-	14.75		0	0.00	1299	99.85
				14.75	-	14.85		0	0.00	1299	99.85
				14.85	-	14.95		1	0.08	1300	99.92
				14.95	-	15.05		0	0.00	1300	99.92
				15.05	-	15.15		1	0.08	1301	100.00

(63) NECK CIRCUMFERENCE

The circumference of the neck at the level of the infrathyroid landmark (Adam's apple) is measured with a tape. The plane of the measurement is perpendicular to the long axis of the neck. The participant stands erect with the head in the Frankfurt plane. The shoulders and upper extremities are relaxed.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
29.12	11.47	1ST	34.60	13.62
29.64	11.67	2ND	35.10	13.82
29.86	11.76	3RD	35.30	13.90
30.11	11.85	5TH	35.70	14.06
30.80	12.13	10TH	36.32	14.30
31.10	12.24	15TH	36.80	14.49
31.32	12.33	20TH	37.10	14.61
31.60	12.44	25TH	37.50	14.76
31.90	12.56	30TH	37.90	14.92
32.00	12.60	35TH	38.20	15.04
32.20	12.68	40TH	38.50	15.16
32.40	12.76	45TH	38.70	15.24
32.50	12.80	50TH	39.00	15.35
32.80	12.91	55TH	39.30	15.47
33.00	12.99	60TH	39.60	15.59
33.20	13.07	65TH	39.90	15.71
33.47	13.18	70TH	40.20	15.83
33.70	13.27	75TH	40.50	15.94
34.00	13.39	80TH	40.90	16.10
34.40	13.54	85TH	41.30	16.26
34.70	13.66	90TH	41.80	16.46
35.40	13.94	95TH	42.70	16.81
35.94	14.14	97TH	43.40	17.09
36.36	14.31	98TH	43.90	17.28
36.96	14.55	99TH	44.50	17.52

(63) NECK CIRCUMFERENCE

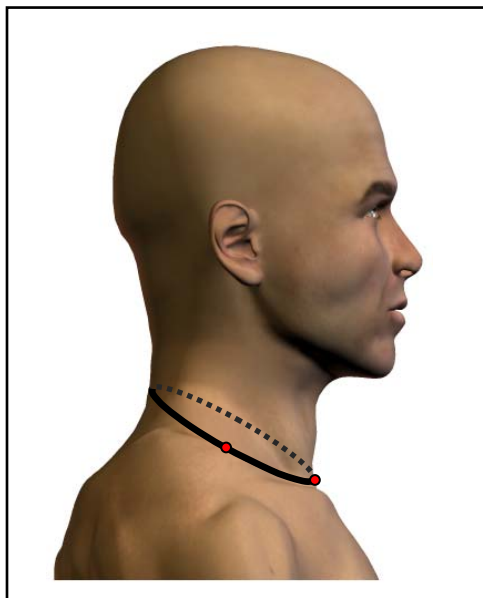
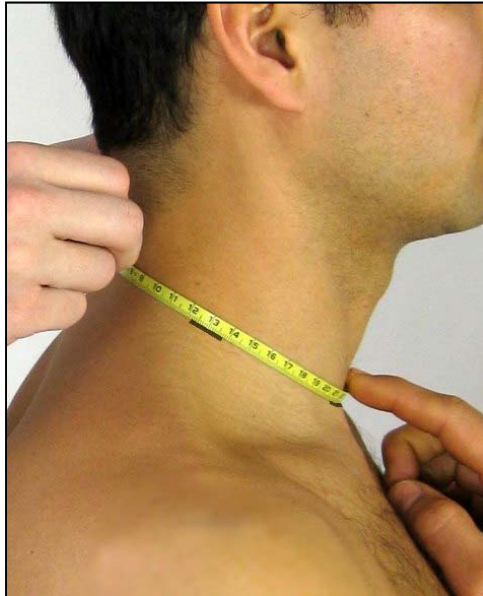
FEMALES		
CM		IN
32.70	MEAN	12.87
0.06	STD ERROR (MEAN)	0.03
1.59	STANDARD DEVIATION	0.63
0.05	STD ERROR (STD DEV)	0.02
28.30	MINIMUM	11.14
38.40	MAXIMUM	15.12
SKEWNESS		0.34
KURTOSIS		3.38
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
39.09	MEAN	15.39
0.06	STD ERROR (MEAN)	0.02
2.17	STANDARD DEVIATION	0.85
0.04	STD ERROR (STD DEV)	0.02
33.50	MINIMUM	13.19
49.70	MAXIMUM	19.57
SKEWNESS		0.32
KURTOSIS		3.34
COEFFICIENT OF VARIATION		5.6%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
2	0.32	2	0.32	28.25	-	28.75					
5	0.81	7	1.13	28.75	-	29.25					
9	1.45	16	2.58	29.25	-	29.75					
20	3.23	36	5.81	29.75	-	30.25					
24	3.87	60	9.68	30.25	-	30.75					
52	8.39	112	18.06	30.75	-	31.25					
58	9.35	170	27.42	31.25	-	31.75					
86	13.87	256	41.29	31.75	-	32.25					
80	12.90	336	54.19	32.25	-	32.75					
73	11.77	409	65.97	32.75	-	33.25					
66	10.65	475	76.61	33.25	-	33.75		2	0.15	2	0.15
45	7.26	520	83.87	33.75	-	34.25		5	0.38	7	0.54
42	6.77	562	90.65	34.25	-	34.75		7	0.54	14	1.08
22	3.55	584	94.19	34.75	-	35.25		22	1.69	36	2.77
14	2.26	598	96.45	35.25	-	35.75		30	2.31	66	5.07
9	1.45	607	97.90	35.75	-	36.25		50	3.84	116	8.92
5	0.81	612	98.71	36.25	-	36.75		72	5.53	188	14.45
4	0.65	616	99.35	36.75	-	37.25		89	6.84	277	21.29
1	0.16	617	99.52	37.25	-	37.75		83	6.38	360	27.67
1	0.16	618	99.68	37.75	-	38.25		108	8.30	468	35.97
2	0.32	620	100.00	38.25	-	38.75		121	9.30	589	45.27
				38.75	-	39.25		114	8.76	703	54.04
				39.25	-	39.75		115	8.84	818	62.87
				39.75	-	40.25		102	7.84	920	70.71
				40.25	-	40.75		93	7.15	1013	77.86
				40.75	-	41.25		82	6.30	1095	84.17
				41.25	-	41.75		65	5.00	1160	89.16
				41.75	-	42.25		51	3.92	1211	93.08
				42.25	-	42.75		31	2.38	1242	95.47
				42.75	-	43.25		13	1.00	1255	96.46
				43.25	-	43.75		16	1.23	1271	97.69
				43.75	-	44.25		15	1.15	1286	98.85
				44.25	-	44.75		4	0.31	1290	99.15
				44.75	-	45.25		3	0.23	1293	99.39
				45.25	-	45.75		3	0.23	1296	99.62
				45.75	-	46.25		2	0.15	1298	99.77
				46.25	-	46.75		1	0.08	1299	99.85
				46.75	-	47.25		0	0.00	1299	99.85
				47.25	-	47.75		1	0.08	1300	99.92
				47.75	-	48.25		0	0.00	1300	99.92
				48.25	-	48.75		0	0.00	1300	99.92
				48.75	-	49.25		0	0.00	1300	99.92
				49.25	-	49.75		1	0.08	1301	100.00

(64) NECK CIRCUMFERENCE, BASE

The circumference of the base of the neck is measured with a tape, passing over the drawn lateral and anterior neck landmarks. The participant stands erect with the head in the Frankfurt plane. The shoulders and upper extremities are relaxed.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
32.30	12.72	1ST	38.30	15.08
32.74	12.89	2ND	39.00	15.35
32.96	12.98	3RD	39.21	15.43
33.50	13.19	5TH	39.70	15.63
34.00	13.39	10TH	40.30	15.87
34.30	13.50	15TH	40.70	16.02
34.50	13.58	20TH	41.20	16.22
34.80	13.70	25TH	41.60	16.38
35.00	13.78	30TH	41.96	16.52
35.30	13.90	35TH	42.20	16.61
35.50	13.98	40TH	42.50	16.73
35.70	14.06	45TH	42.80	16.85
35.90	14.13	50TH	43.00	16.93
36.10	14.21	55TH	43.40	17.09
36.30	14.29	60TH	43.62	17.18
36.60	14.41	65TH	43.90	17.28
36.80	14.49	70TH	44.20	17.40
37.10	14.61	75TH	44.50	17.52
37.50	14.76	80TH	44.96	17.70
37.70	14.84	85TH	45.30	17.83
38.20	15.04	90TH	45.90	18.07
39.00	15.35	95TH	46.80	18.43
39.44	15.52	97TH	47.50	18.70
39.90	15.71	98TH	47.90	18.86
40.46	15.93	99TH	48.50	19.09

(64) NECK CIRCUMFERENCE, BASE

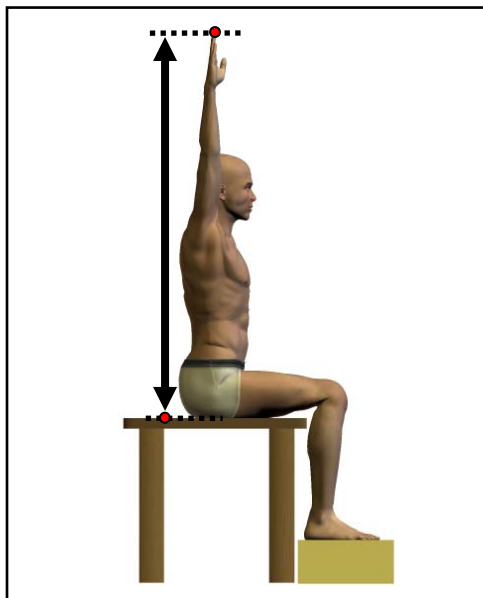
FEMALES		
CM		IN
36.00	MEAN	14.17
0.07	STD ERROR (MEAN)	0.03
1.71	STANDARD DEVIATION	0.67
0.05	STD ERROR (STD DEV)	0.02
30.90	MINIMUM	12.17
42.80	MAXIMUM	16.85
SKEWNESS		0.39
KURTOSIS		3.56
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
43.11	MEAN	16.97
0.06	STD ERROR (MEAN)	0.02
2.19	STANDARD DEVIATION	0.86
0.04	STD ERROR (STD DEV)	0.02
36.70	MINIMUM	14.45
53.00	MAXIMUM	20.87
SKEWNESS		0.23
KURTOSIS		3.17
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES			MALES			
E	FPct	CumF	CumFPct		CM		E	FPct	CumF	CumFPct
1	0.16	1	0.16	30.75	-	31.25				
1	0.16	2	0.32	31.25	-	31.75				
3	0.48	5	0.81	31.75	-	32.25				
7	1.13	12	1.94	32.25	-	32.75				
15	2.42	27	4.35	32.75	-	33.25				
20	3.23	47	7.58	33.25	-	33.75				
44	7.10	91	14.68	33.75	-	34.25				
61	9.84	152	24.52	34.25	-	34.75				
58	9.35	210	33.87	34.75	-	35.25				
81	13.06	291	46.94	35.25	-	35.75				
73	11.77	364	58.71	35.75	-	36.25				
64	10.32	428	69.03	36.25	-	36.75	1	0.08	1	0.08
56	9.03	484	78.06	36.75	-	37.25	1	0.08	2	0.15
48	7.74	532	85.81	37.25	-	37.75	5	0.38	7	0.54
34	5.48	566	91.29	37.75	-	38.25	4	0.31	11	0.85
18	2.90	584	94.19	38.25	-	38.75	9	0.69	20	1.54
14	2.26	598	96.45	38.75	-	39.25	19	1.46	39	3.00
9	1.45	607	97.90	39.25	-	39.75	30	2.31	69	5.30
5	0.81	612	98.71	39.75	-	40.25	56	4.30	125	9.61
3	0.48	615	99.19	40.25	-	40.75	73	5.61	198	15.22
1	0.16	616	99.35	40.75	-	41.25	71	5.46	269	20.68
2	0.32	618	99.68	41.25	-	41.75	86	6.61	355	27.29
0	0.00	618	99.68	41.75	-	42.25	105	8.07	460	35.36
1	0.16	619	99.84	42.25	-	42.75	113	8.69	573	44.04
1	0.16	620	100.00	42.75	-	43.25	118	9.07	691	53.11
				43.25	-	43.75	110	8.46	801	61.57
				43.75	-	44.25	117	8.99	918	70.56
				44.25	-	44.75	93	7.15	1011	77.71
				44.75	-	45.25	89	6.84	1100	84.55
				45.25	-	45.75	62	4.77	1162	89.32
				45.75	-	46.25	32	2.46	1194	91.78
				46.25	-	46.75	40	3.07	1234	94.85
				46.75	-	47.25	15	1.15	1249	96.00
				47.25	-	47.75	23	1.77	1272	97.77
				47.75	-	48.25	13	1.00	1285	98.77
				48.25	-	48.75	5	0.38	1290	99.15
				48.75	-	49.25	5	0.38	1295	99.54
				49.25	-	49.75	3	0.23	1298	99.77
				49.75	-	50.25	1	0.08	1299	99.85
				50.25	-	50.75	0	0.00	1299	99.85
				50.75	-	51.25	1	0.08	1300	99.92
				51.25	-	51.75	0	0.00	1300	99.92
				51.75	-	52.25	0	0.00	1300	99.92
				52.25	-	52.75	0	0.00	1300	99.92
				52.75	-	53.25	1	0.08	1301	100.00

(65) OVERHEAD FINGERTIP REACH, SITTING

The vertical distance between a sitting surface and the dactylion III landmark of a seated participant whose arm is extended overhead is measured with an anthropometer. The participant sits erect on a flat surface 45.8 cm high with the right arm and hand extended vertically overhead as far as possible and the palm of the hand facing forward. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
119.56	47.07	1ST	131.30	51.69
121.00	47.64	2ND	132.90	52.32
121.93	48.00	3RD	133.91	52.72
123.00	48.43	5TH	135.20	53.23
125.48	49.40	10TH	137.00	53.94
126.89	49.95	15TH	138.53	54.54
127.98	50.38	20TH	139.60	54.96
129.20	50.87	25TH	140.60	55.35
130.17	51.25	30TH	141.40	55.67
131.07	51.60	35TH	142.20	55.98
131.76	51.87	40TH	142.88	56.25
132.30	52.09	45TH	143.69	56.57
133.20	52.44	50TH	144.60	56.93
134.20	52.83	55TH	145.20	57.17
134.74	53.05	60TH	146.00	57.48
135.40	53.31	65TH	147.00	57.87
136.30	53.66	70TH	148.10	58.31
137.40	54.09	75TH	149.10	58.70
138.12	54.38	80TH	150.30	59.17
139.02	54.73	85TH	151.40	59.61
140.51	55.31	90TH	152.90	60.20
143.00	56.30	95TH	155.30	61.14
144.46	56.87	97TH	156.69	61.69
145.75	57.38	98TH	157.70	62.09
147.42	58.04	99TH	158.70	62.48

(65) OVERHEAD FINGERTIP REACH, SITTING

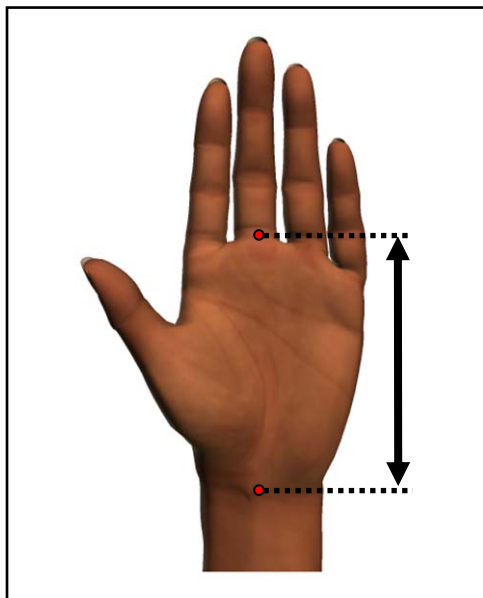
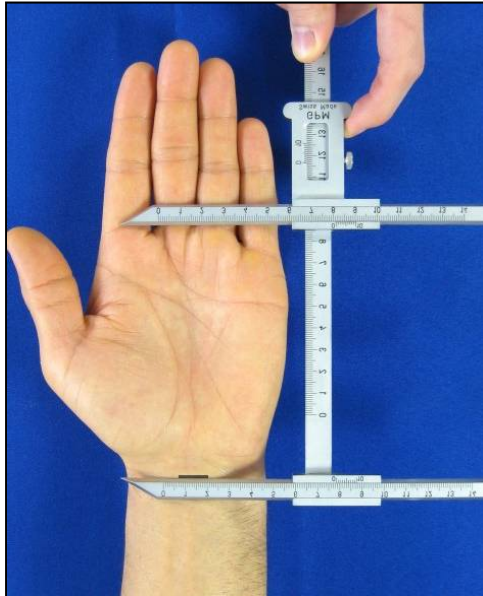
FEMALES		
<u>CM</u>		<u>IN</u>
133.15	MEAN	52.42
0.24	STD ERROR (MEAN)	0.09
5.90	STANDARD DEVIATION	2.32
0.17	STD ERROR (STD DEV)	0.07
116.90	MINIMUM	46.02
148.70	MAXIMUM	58.54
SKEWNESS		-0.02
KURTOSIS		2.79
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		618

MALES		
<u>CM</u>		<u>IN</u>
144.77	MEAN	57.00
0.17	STD ERROR (MEAN)	0.07
6.13	STANDARD DEVIATION	2.41
0.12	STD ERROR (STD DEV)	0.05
125.80	MINIMUM	49.53
163.10	MAXIMUM	64.21
SKEWNESS		0.09
KURTOSIS		2.75
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES		MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	115.75	-	117.25			
1	0.16	2	0.32	117.25	-	118.75			
5	0.81	7	1.13	118.75	-	120.25			
11	1.78	18	2.91	120.25	-	121.75			
17	2.75	35	5.66	121.75	-	123.25			
20	3.24	55	8.90	123.25	-	124.75			
22	3.56	77	12.46	124.75	-	126.25	1	0.08	1
37	5.99	114	18.45	126.25	-	127.75	2	0.15	3
42	6.80	156	25.24	127.75	-	129.25	4	0.31	7
49	7.93	205	33.17	129.25	-	130.75	5	0.38	12
72	11.65	277	44.82	130.75	-	132.25	8	0.61	20
51	8.25	328	53.07	132.25	-	133.75	15	1.15	35
68	11.00	396	64.08	133.75	-	135.25	32	2.46	67
48	7.77	444	71.84	135.25	-	136.75	53	4.07	120
55	8.90	499	80.74	136.75	-	138.25	62	4.77	182
40	6.47	539	87.22	138.25	-	139.75	88	6.76	270
33	5.34	572	92.56	139.75	-	141.25	109	8.38	379
12	1.94	584	94.50	141.25	-	142.75	131	10.07	510
16	2.59	600	97.09	142.75	-	144.25	116	8.92	626
6	0.97	606	98.06	144.25	-	145.75	132	10.15	758
6	0.97	612	99.03	145.75	-	147.25	110	8.46	868
6	0.97	618	100.00	147.25	-	148.75	87	6.69	955
				148.75	-	150.25	85	6.53	1040
				150.25	-	151.75	86	6.61	1126
				151.75	-	153.25	61	4.69	1187
				153.25	-	154.75	36	2.77	1223
				154.75	-	156.25	32	2.46	1255
				156.25	-	157.75	22	1.69	1277
				157.75	-	159.25	16	1.23	1293
				159.25	-	160.75	5	0.38	1298
				160.75	-	162.25	2	0.15	1300
				162.25	-	163.75	1	0.08	1301
									100.00

(66) PALM LENGTH

The distance between the center of the crease at the base of the middle finger (digit III, base) and the ventral stylium landmark is measured with a Poech sliding caliper. The participant holds the right forearm horizontal with the hand straight, palm up. The fingers are together, and the thumb is abducted approximately 45°. The middle finger is parallel to the long axis of the forearm.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
9.62	3.79	1ST	10.30	4.06
9.80	3.86	2ND	10.40	4.09
9.90	3.90	3RD	10.50	4.13
10.00	3.94	5TH	10.70	4.21
10.20	4.02	10TH	10.90	4.29
10.30	4.06	15TH	11.00	4.33
10.42	4.10	20TH	11.10	4.37
10.50	4.13	25TH	11.20	4.41
10.60	4.17	30TH	11.30	4.45
10.60	4.17	35TH	11.40	4.49
10.70	4.21	40TH	11.50	4.53
10.80	4.25	45TH	11.50	4.53
10.90	4.29	50TH	11.60	4.57
11.00	4.33	55TH	11.70	4.61
11.00	4.33	60TH	11.80	4.65
11.10	4.37	65TH	11.80	4.65
11.20	4.41	70TH	11.90	4.69
11.30	4.45	75TH	12.00	4.72
11.40	4.49	80TH	12.20	4.80
11.50	4.53	85TH	12.30	4.84
11.60	4.57	90TH	12.50	4.92
11.90	4.69	95TH	12.70	5.00
12.00	4.72	97TH	12.90	5.08
12.00	4.72	98TH	13.00	5.12
12.20	4.80	99TH	13.20	5.20

(66) PALM LENGTH

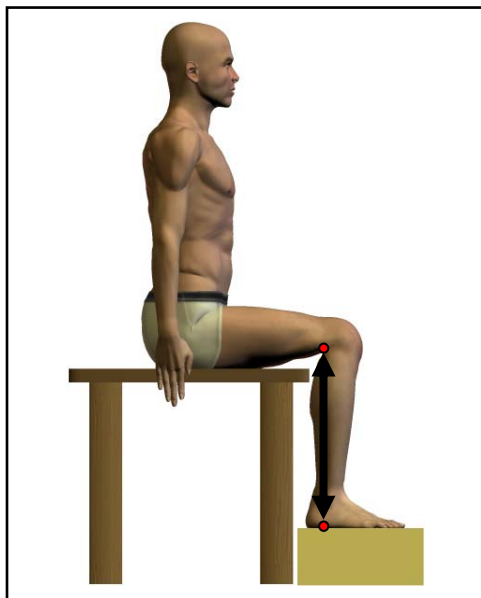
FEMALES		
CM		IN
10.90	MEAN	4.29
0.02	STD ERROR (MEAN)	0.01
0.55	STANDARD DEVIATION	0.22
0.02	STD ERROR (STD DEV)	0.01
9.50	MINIMUM	3.74
13.00	MAXIMUM	5.12
SKEWNESS		
		0.19
KURTOSIS		
		2.96
COEFFICIENT OF VARIATION		
		5.0%
NUMBER OF PARTICIPANTS		
		620

MALES		
CM		IN
11.64	MEAN	4.59
0.02	STD ERROR (MEAN)	0.01
0.62	STANDARD DEVIATION	0.24
0.01	STD ERROR (STD DEV)	0.00
10.00	MINIMUM	3.94
14.50	MAXIMUM	5.71
SKEWNESS		
		0.27
KURTOSIS		
		3.25
COEFFICIENT OF VARIATION		
		5.3%
NUMBER OF PARTICIPANTS		
		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
2	0.32	2	0.32	9.45	-	9.55		2	0.15	2	0.15
4	0.65	6	0.97	9.55	-	9.65		5	0.38	7	0.54
5	0.81	11	1.77	9.65	-	9.75		1	0.08	8	0.61
3	0.48	14	2.26	9.75	-	9.85		10	0.77	18	1.38
5	0.81	19	3.06	9.85	-	9.95		8	0.61	26	2.00
13	2.10	32	5.16	9.95	-	10.05		17	1.31	43	3.31
18	2.90	50	8.06	10.05	-	10.15		15	1.15	58	4.46
23	3.71	73	11.77	10.15	-	10.25		22	1.69	80	6.15
23	3.71	96	15.48	10.25	-	10.35		48	3.69	128	9.84
28	4.52	124	20.00	10.35	-	10.45		35	2.69	163	12.53
46	7.42	170	27.42	10.45	-	10.55		58	4.46	221	16.99
49	7.90	219	35.32	10.55	-	10.65		60	4.61	281	21.60
40	6.45	259	41.77	10.65	-	10.75		58	4.46	339	26.06
38	6.13	297	47.90	10.75	-	10.85		65	5.00	404	31.05
36	5.81	333	53.71	10.85	-	10.95		79	6.07	483	37.13
60	9.68	393	63.39	10.95	-	11.05		119	9.15	602	46.27
34	5.48	427	68.87	11.05	-	11.15		86	6.61	688	52.88
31	5.00	458	73.87	11.15	-	11.25		77	5.92	765	58.80
30	4.84	488	78.71	11.25	-	11.35		88	6.76	853	65.56
34	5.48	522	84.19	11.35	-	11.45		63	4.84	916	70.41
24	3.87	546	88.06	11.45	-	11.55		76	5.84	992	76.25
15	2.42	561	90.48	11.55	-	11.65		44	3.38	1036	79.63
16	2.58	577	93.06	11.65	-	11.75		49	3.77	1085	83.40
10	1.61	587	94.68	11.75	-	11.85		40	3.07	1125	86.47
13	2.10	600	96.77	11.85	-	11.95		43	3.31	1168	89.78
9	1.45	609	98.23	11.95	-	12.05		39	3.00	1207	92.77
3	0.48	612	98.71	12.05	-	12.15		21	1.61	1228	94.39
4	0.65	616	99.35	12.15	-	12.25		19	1.46	1247	95.85
2	0.32	618	99.68	12.25	-	12.35		12	0.92	1259	96.77
1	0.16	619	99.84	12.35	-	12.45		12	0.92	1271	97.69
0	0.00	619	99.84	12.45	-	12.55		8	0.61	1279	98.31
0	0.00	619	99.84	12.55	-	12.65		7	0.54	1286	98.85
0	0.00	619	99.84	12.65	-	12.75		3	0.23	1289	99.08
0	0.00	619	99.84	12.75	-	12.85		5	0.38	1294	99.46
0	0.00	619	99.84	12.85	-	12.95		2	0.15	1296	99.62
1	0.16	620	100.00	12.95	-	13.05		3	0.23	1299	99.85
				13.05	-	13.15		0	0.00	1299	99.85
				13.15	-	13.25		1	0.08	1300	99.92
				13.25	-	13.35		0	0.00	1300	99.92
				13.35	-	13.45		0	0.00	1300	99.92
				13.45	-	13.55		0	0.00	1300	99.92
				13.55	-	13.65		0	0.00	1300	99.92
				13.65	-	13.75		0	0.00	1300	99.92
				13.75	-	13.85		0	0.00	1300	99.92
				13.85	-	13.95		0	0.00	1300	99.92
				13.95	-	14.05		0	0.00	1300	99.92
				14.05	-	14.15		0	0.00	1300	99.92
				14.15	-	14.25		0	0.00	1300	99.92
				14.25	-	14.35		0	0.00	1300	99.92
				14.35	-	14.45		0	0.00	1300	99.92
				14.45	-	14.55		1	0.08	1301	100.00

(67) POPLITEAL HEIGHT

The vertical distance from a footrest surface to the back of the right knee (the popliteal fossa at the dorsal juncture of the calf and thigh) is measured with an anthropometer. The participant sits with the thighs parallel, the feet in line with the thighs, and the knees flexed 90°.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
33.70	13.27	1ST	37.20	14.65
34.20	13.46	2ND	37.70	14.84
34.46	13.57	3RD	38.40	15.12
34.70	13.66	5TH	38.80	15.28
35.51	13.98	10TH	39.50	15.55
35.90	14.13	15TH	40.10	15.79
36.50	14.37	20TH	40.60	15.98
36.80	14.49	25TH	41.00	16.14
37.00	14.57	30TH	41.40	16.30
37.30	14.69	35TH	41.70	16.42
37.60	14.80	40TH	42.00	16.54
37.90	14.92	45TH	42.30	16.65
38.20	15.04	50TH	42.60	16.77
38.50	15.16	55TH	42.90	16.89
38.80	15.28	60TH	43.20	17.01
39.00	15.35	65TH	43.50	17.13
39.37	15.50	70TH	43.80	17.24
39.60	15.59	75TH	44.30	17.44
39.90	15.71	80TH	44.70	17.60
40.40	15.91	85TH	45.30	17.83
40.90	16.10	90TH	46.00	18.11
41.60	16.38	95TH	46.79	18.43
42.20	16.61	97TH	47.60	18.74
42.86	16.87	98TH	48.10	18.94
43.68	17.19	99TH	48.40	19.06

(67) POPLITEAL HEIGHT

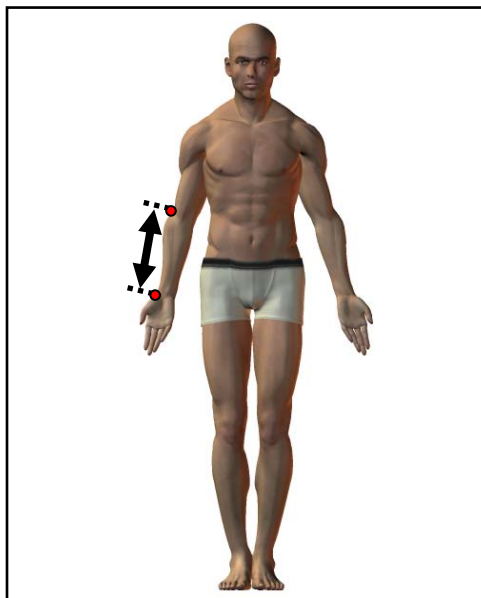
FEMALES		
CM		IN
38.21	MEAN	15.04
0.08	STD ERROR (MEAN)	0.03
2.11	STANDARD DEVIATION	0.83
0.06	STD ERROR (STD DEV)	0.02
32.60	MINIMUM	12.83
46.90	MAXIMUM	18.46
SKEWNESS		0.20
KURTOSIS		3.18
COEFFICIENT OF VARIATION		5.5%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
42.67	MEAN	16.80
0.07	STD ERROR (MEAN)	0.03
2.45	STANDARD DEVIATION	0.97
0.05	STD ERROR (STD DEV)	0.02
35.00	MINIMUM	13.78
50.50	MAXIMUM	19.88
SKEWNESS		0.15
KURTOSIS		3.00
COEFFICIENT OF VARIATION		5.7%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	32.25	-	32.75					
3	0.48	4	0.65	32.75	-	33.25					
3	0.48	7	1.13	33.25	-	33.75					
6	0.97	13	2.10	33.75	-	34.25					
20	3.23	33	5.32	34.25	-	34.75					
18	2.90	51	8.23	34.75	-	35.25		1	0.08	1	0.08
26	4.19	77	12.42	35.25	-	35.75		1	0.08	2	0.15
32	5.16	109	17.58	35.75	-	36.25		3	0.23	5	0.38
45	7.26	154	24.84	36.25	-	36.75		2	0.15	7	0.54
56	9.03	210	33.87	36.75	-	37.25		6	0.46	13	1.00
54	8.71	264	42.58	37.25	-	37.75		14	1.08	27	2.08
52	8.39	316	50.97	37.75	-	38.25		8	0.61	35	2.69
44	7.10	360	58.06	38.25	-	38.75		29	2.23	64	4.92
67	10.81	427	68.87	38.75	-	39.25		39	3.00	103	7.92
55	8.87	482	77.74	39.25	-	39.75		46	3.54	149	11.45
38	6.13	520	83.87	39.75	-	40.25		63	4.84	212	16.30
32	5.16	552	89.03	40.25	-	40.75		65	5.00	277	21.29
27	4.35	579	93.39	40.75	-	41.25		82	6.30	359	27.59
17	2.74	596	96.13	41.25	-	41.75		108	8.30	467	35.90
7	1.13	603	97.26	41.75	-	42.25		108	8.30	575	44.20
4	0.65	607	97.90	42.25	-	42.75		115	8.84	690	53.04
6	0.97	613	98.87	42.75	-	43.25		93	7.15	783	60.18
2	0.32	615	99.19	43.25	-	43.75		116	8.92	899	69.10
2	0.32	617	99.52	43.75	-	44.25		74	5.69	973	74.79
1	0.16	618	99.68	44.25	-	44.75		72	5.53	1045	80.32
1	0.16	619	99.84	44.75	-	45.25		57	4.38	1102	84.70
0	0.00	619	99.84	45.25	-	45.75		57	4.38	1159	89.09
0	0.00	619	99.84	45.75	-	46.25		36	2.77	1195	91.85
0	0.00	619	99.84	46.25	-	46.75		41	3.15	1236	95.00
1	0.16	620	100.00	46.75	-	47.25		18	1.38	1254	96.39
				47.25	-	47.75		14	1.08	1268	97.46
				47.75	-	48.25		12	0.92	1280	98.39
				48.25	-	48.75		11	0.85	1291	99.23
				48.75	-	49.25		2	0.15	1293	99.39
				49.25	-	49.75		2	0.15	1295	99.54
				49.75	-	50.25		4	0.31	1299	99.85
				50.25	-	50.75		2	0.15	1301	100.00

(68) RADIALE-STYLION LENGTH

The distance between the radiale landmark and the stylium landmark is measured with a beam caliper held parallel to the long axis of the forearm. The participant stands with the arms relaxed at the sides. The hand and fingers are held straight in line with the long axis of the forearm with the palm facing forward.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
21.50	8.46	1ST	23.40	9.21
21.70	8.54	2ND	23.80	9.37
21.90	8.62	3RD	23.90	9.41
22.10	8.70	5TH	24.20	9.53
22.50	8.86	10TH	24.80	9.76
22.80	8.98	15TH	25.00	9.84
23.00	9.06	20TH	25.24	9.94
23.20	9.13	25TH	25.50	10.04
23.40	9.21	30TH	25.70	10.12
23.60	9.29	35TH	25.90	10.20
23.70	9.33	40TH	26.10	10.28
23.90	9.41	45TH	26.30	10.35
24.10	9.49	50TH	26.40	10.39
24.30	9.57	55TH	26.60	10.47
24.40	9.61	60TH	26.90	10.59
24.60	9.69	65TH	27.10	10.67
24.90	9.80	70TH	27.30	10.75
25.10	9.88	75TH	27.50	10.83
25.40	10.00	80TH	27.80	10.94
25.60	10.08	85TH	28.10	11.06
26.00	10.24	90TH	28.50	11.22
26.50	10.43	95TH	29.10	11.46
26.74	10.52	97TH	29.50	11.61
27.20	10.71	98TH	29.80	11.73
27.50	10.83	99TH	30.10	11.85

(68) RADIALE-STYLION LENGTH

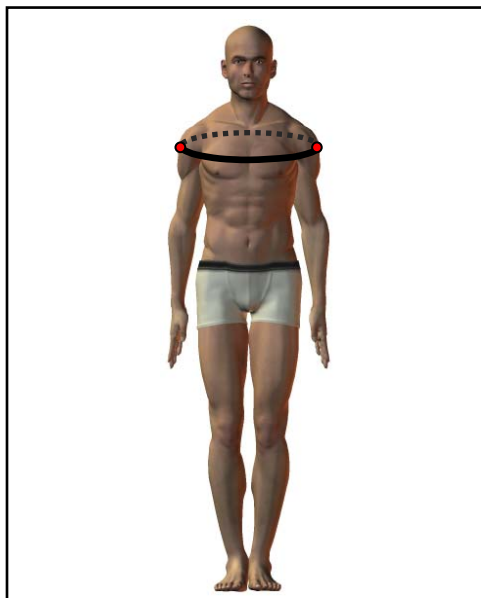
FEMALES		
CM		IN
24.18	MEAN	9.52
0.05	STD ERROR (MEAN)	0.02
1.35	STANDARD DEVIATION	0.53
0.04	STD ERROR (STD DEV)	0.02
20.90	MINIMUM	8.23
29.10	MAXIMUM	11.46
SKEWNESS		0.34
KURTOSIS		2.96
COEFFICIENT OF VARIATION		5.6%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
26.54	MEAN	10.45
0.04	STD ERROR (MEAN)	0.02
1.48	STANDARD DEVIATION	0.58
0.03	STD ERROR (STD DEV)	0.01
21.90	MINIMUM	8.62
31.40	MAXIMUM	12.36
SKEWNESS		0.22
KURTOSIS		2.91
COEFFICIENT OF VARIATION		5.6%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
3	0.48	3	0.48	20.75	-	21.25					
11	1.77	14	2.26	21.25	-	21.75					
23	3.71	37	5.97	21.75	-	22.25		2	0.15	2	0.15
53	8.55	90	14.52	22.25	-	22.75		2	0.15	4	0.31
71	11.45	161	25.97	22.75	-	23.25		4	0.31	8	0.61
92	14.84	253	40.81	23.25	-	23.75		17	1.31	25	1.92
82	13.23	335	54.03	23.75	-	24.25		42	3.23	67	5.15
86	13.87	421	67.90	24.25	-	24.75		61	4.69	128	9.84
53	8.55	474	76.45	24.75	-	25.25		132	10.15	260	19.98
64	10.32	538	86.77	25.25	-	25.75		142	10.91	402	30.90
41	6.61	579	93.39	25.75	-	26.25		172	13.22	574	44.12
23	3.71	602	97.10	26.25	-	26.75		174	13.37	748	57.49
8	1.29	610	98.39	26.75	-	27.25		136	10.45	884	67.95
5	0.81	615	99.19	27.25	-	27.75		149	11.45	1033	79.40
3	0.48	618	99.68	27.75	-	28.25		104	7.99	1137	87.39
1	0.16	619	99.84	28.25	-	28.75		66	5.07	1203	92.47
1	0.16	620	100.00	28.75	-	29.25		42	3.23	1245	95.70
				29.25	-	29.75		28	2.15	1273	97.85
				29.75	-	30.25		19	1.46	1292	99.31
				30.25	-	30.75		4	0.31	1296	99.62
				30.75	-	31.25		4	0.31	1300	99.92
				31.25	-	31.75		1	0.08	1301	100.00

(69) SHOULDER CIRCUMFERENCE*

The circumference of the shoulders at the level of the right and left deltoid point landmarks is measured with a tape. The participant stands erect, looking straight ahead. The shoulders and upper extremities are relaxed with the palms facing the thighs. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
91.62	36.07	1ST	103.40	40.71
92.14	36.28	2ND	104.80	41.26
92.86	36.56	3RD	105.51	41.54
93.91	36.97	5TH	106.60	41.97
95.60	37.64	10TH	108.70	42.80
96.80	38.11	15TH	110.10	43.35
97.60	38.43	20TH	111.10	43.74
98.30	38.70	25TH	112.10	44.13
99.10	39.02	30TH	113.20	44.57
99.74	39.26	35TH	114.10	44.92
100.40	39.53	40TH	114.80	45.20
100.85	39.70	45TH	115.40	45.43
101.40	39.92	50TH	116.40	45.83
102.30	40.28	55TH	117.10	46.10
102.80	40.47	60TH	117.60	46.30
103.20	40.63	65TH	118.50	46.65
103.90	40.91	70TH	119.30	46.97
104.70	41.22	75TH	120.35	47.38
105.40	41.50	80TH	121.20	47.72
106.10	41.77	85TH	122.60	48.27
107.00	42.13	90TH	124.00	48.82
109.19	42.98	95TH	126.60	49.84
110.90	43.66	97TH	127.69	50.28
111.60	43.94	98TH	128.80	50.71
112.76	44.39	99TH	130.19	51.26

*The definition of the deltoid landmark has changed since the ANSUR survey; (see "THE LANDMARKS" in Chapter II on page 18). As the level of the two shoulders is often slightly different, this measurement may not always be horizontal.

(69) SHOULDER CIRCUMFERENCE

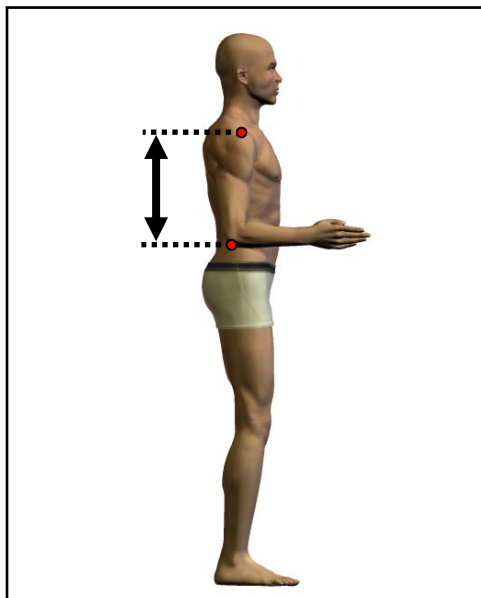
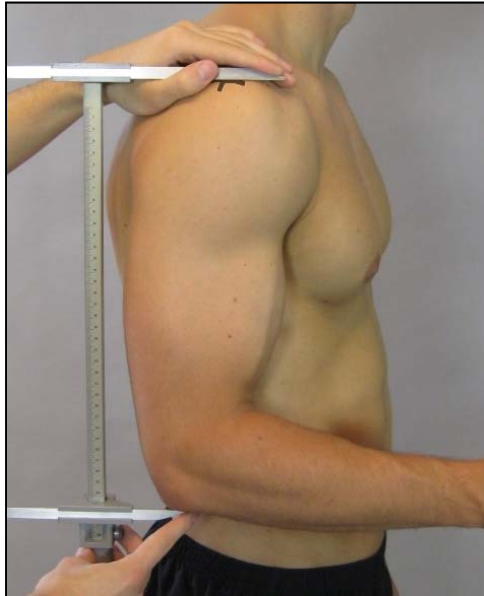
FEMALES		
CM		IN
101.52	MEAN	39.97
0.18	STD ERROR (MEAN)	0.07
4.57	STANDARD DEVIATION	1.80
0.13	STD ERROR (STD DEV)	0.05
89.10	MINIMUM	35.08
116.00	MAXIMUM	45.67
SKEWNESS		0.12
KURTOSIS		2.98
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
116.32	MEAN	45.80
0.16	STD ERROR (MEAN)	0.06
5.90	STANDARD DEVIATION	2.32
0.12	STD ERROR (STD DEV)	0.05
95.50	MINIMUM	37.60
133.80	MAXIMUM	52.68
SKEWNESS		0.07
KURTOSIS		2.81
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
2	0.32	2	0.32	88.75	-	90.25					
6	0.97	8	1.29	90.25	-	91.75					
13	2.10	21	3.39	91.75	-	93.25					
23	3.71	44	7.10	93.25	-	94.75					
38	6.13	82	13.23	94.75	-	96.25		1	0.08	1	0.08
48	7.74	130	20.97	96.25	-	97.75		0	0.00	1	0.08
63	10.16	193	31.13	97.75	-	99.25		0	0.00	1	0.08
81	13.06	274	44.19	99.25	-	100.75		1	0.08	2	0.15
66	10.65	340	54.84	100.75	-	102.25		3	0.23	5	0.38
85	13.71	425	68.55	102.25	-	103.75		13	1.00	18	1.38
60	9.68	485	78.23	103.75	-	105.25		18	1.38	36	2.77
65	10.48	550	88.71	105.25	-	106.75		33	2.54	69	5.30
33	5.32	583	94.03	106.75	-	108.25		42	3.23	111	8.53
10	1.61	593	95.65	108.25	-	109.75		65	5.00	176	13.53
11	1.77	604	97.42	109.75	-	111.25		94	7.23	270	20.75
10	1.61	614	99.03	111.25	-	112.75		80	6.15	350	26.90
2	0.32	616	99.35	112.75	-	114.25		118	9.07	468	35.97
3	0.48	619	99.84	114.25	-	115.75		138	10.61	606	46.58
1	0.16	620	100.00	115.75	-	117.25		136	10.45	742	57.03
				117.25	-	118.75		127	9.76	869	66.79
				118.75	-	120.25		99	7.61	968	74.40
				120.25	-	121.75		98	7.53	1066	81.94
				121.75	-	123.25		74	5.69	1140	87.62
				123.25	-	124.75		57	4.38	1197	92.01
				124.75	-	126.25		33	2.54	1230	94.54
				126.25	-	127.75		34	2.61	1264	97.16
				127.75	-	129.25		15	1.15	1279	98.31
				129.25	-	130.75		13	1.00	1292	99.31
				130.75	-	132.25		6	0.46	1298	99.77
				132.25	-	133.75		1	0.08	1299	99.85
				133.75	-	135.25		2	0.15	1301	100.00

(70) SHOULDER-ELBOW LENGTH

The distance between the right acromion landmark and the olecranon bottom landmark is measured with a beam caliper parallel to the long axis of the upper arm. The participant stands with the right upper arm hanging at the side and the elbow flexed 90°. The hand is straight, and the palm faces inward.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
30.04	11.83	1ST	32.30	12.72
30.30	11.93	2ND	32.80	12.91
30.66	12.08	3RD	33.00	12.99
30.91	12.17	5TH	33.51	13.19
31.60	12.44	10TH	34.10	13.43
31.80	12.52	15TH	34.60	13.62
32.10	12.64	20TH	34.90	13.74
32.43	12.77	25TH	35.20	13.86
32.70	12.87	30TH	35.40	13.94
32.90	12.95	35TH	35.70	14.06
33.10	13.03	40TH	35.90	14.13
33.40	13.15	45TH	36.10	14.21
33.60	13.23	50TH	36.30	14.29
33.80	13.31	55TH	36.50	14.37
34.00	13.39	60TH	36.72	14.46
34.20	13.46	65TH	37.00	14.57
34.40	13.54	70TH	37.30	14.69
34.60	13.62	75TH	37.50	14.76
34.90	13.74	80TH	37.90	14.92
35.20	13.86	85TH	38.20	15.04
35.60	14.02	90TH	38.58	15.19
36.30	14.29	95TH	39.40	15.51
36.77	14.48	97TH	39.90	15.71
37.42	14.73	98TH	40.10	15.79
38.00	14.96	99TH	40.80	16.06

(70) SHOULDER-ELBOW LENGTH

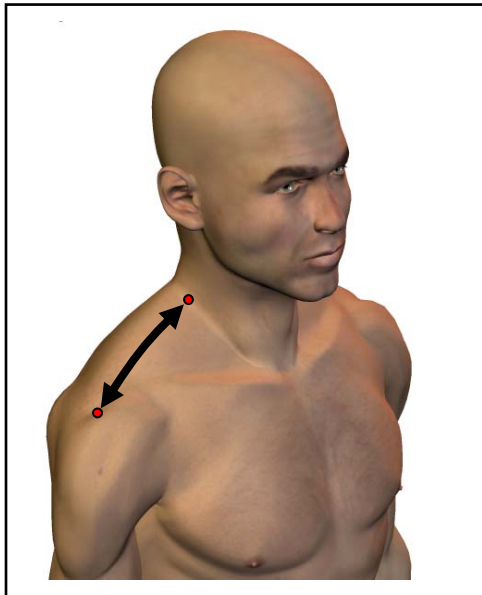
FEMALES		
<u>CM</u>		<u>IN</u>
33.59	MEAN	13.22
0.07	STD ERROR (MEAN)	0.03
1.62	STANDARD DEVIATION	0.64
0.05	STD ERROR (STD DEV)	0.02
29.40	MINIMUM	11.57
38.50	MAXIMUM	15.16
SKEWNESS		0.21
KURTOSIS		3.02
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
36.37	MEAN	14.32
0.05	STD ERROR (MEAN)	0.02
1.78	STANDARD DEVIATION	0.70
0.03	STD ERROR (STD DEV)	0.01
30.20	MINIMUM	11.89
43.20	MAXIMUM	17.01
SKEWNESS		0.08
KURTOSIS		3.16
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
2	0.32	2	0.32	29.25	-	29.75					
8	1.29	10	1.61	29.75	-	30.25	1	0.08	1	0.08	
10	1.61	20	3.23	30.25	-	30.75	0	0.00	1	0.08	
23	3.71	43	6.94	30.75	-	31.25	2	0.15	3	0.23	
36	5.81	79	12.74	31.25	-	31.75	4	0.31	7	0.54	
56	9.03	135	21.77	31.75	-	32.25	5	0.38	12	0.92	
60	9.68	195	31.45	32.25	-	32.75	11	0.85	23	1.77	
63	10.16	258	41.61	32.75	-	33.25	26	2.00	49	3.77	
72	11.61	330	53.23	33.25	-	33.75	43	3.31	92	7.07	
85	13.71	415	66.94	33.75	-	34.25	64	4.92	156	11.99	
67	10.81	482	77.74	34.25	-	34.75	78	6.00	234	17.99	
46	7.42	528	85.16	34.75	-	35.25	104	7.99	338	25.98	
35	5.65	563	90.81	35.25	-	35.75	123	9.45	461	35.43	
25	4.03	588	94.84	35.75	-	36.25	170	13.07	631	48.50	
14	2.26	602	97.10	36.25	-	36.75	150	11.53	781	60.03	
4	0.65	606	97.74	36.75	-	37.25	125	9.61	906	69.64	
7	1.13	613	98.87	37.25	-	37.75	121	9.30	1027	78.94	
5	0.81	618	99.68	37.75	-	38.25	97	7.46	1124	86.40	
2	0.32	620	100.00	38.25	-	38.75	61	4.69	1185	91.08	
				38.75	-	39.25	41	3.15	1226	94.24	
				39.25	-	39.75	27	2.08	1253	96.31	
				39.75	-	40.25	25	1.92	1278	98.23	
				40.25	-	40.75	9	0.69	1287	98.92	
				40.75	-	41.25	10	0.77	1297	99.69	
				41.25	-	41.75	3	0.23	1300	99.92	
				41.75	-	42.25	0	0.00	1300	99.92	
				42.25	-	42.75	0	0.00	1300	99.92	
				42.75	-	43.25	1	0.08	1301	100.00	

(71) SHOULDER LENGTH

The surface distance between the right trapezius landmark and the right acromion landmark is measured with a tape. The participant stands erect, looking straight ahead. The shoulders and upper extremities are relaxed.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
11.32	4.46	1ST	12.70	5.00
11.60	4.57	2ND	12.80	5.04
11.90	4.69	3RD	13.00	5.12
12.00	4.72	5TH	13.20	5.20
12.40	4.88	10TH	13.50	5.31
12.70	5.00	15TH	13.70	5.39
12.90	5.08	20TH	13.90	5.47
13.00	5.12	25TH	14.05	5.53
13.20	5.20	30TH	14.20	5.59
13.30	5.24	35TH	14.40	5.67
13.50	5.31	40TH	14.50	5.71
13.55	5.33	45TH	14.70	5.79
13.70	5.39	50TH	14.80	5.83
13.80	5.43	55TH	14.90	5.87
14.00	5.51	60TH	15.00	5.91
14.10	5.55	65TH	15.20	5.98
14.20	5.59	70TH	15.30	6.02
14.40	5.67	75TH	15.50	6.10
14.50	5.71	80TH	15.70	6.18
14.80	5.83	85TH	16.00	6.30
15.00	5.91	90TH	16.30	6.42
15.30	6.02	95TH	16.70	6.57
15.60	6.14	97TH	16.90	6.65
15.96	6.28	98TH	17.10	6.73
16.18	6.37	99TH	17.40	6.85

(71) SHOULDER LENGTH

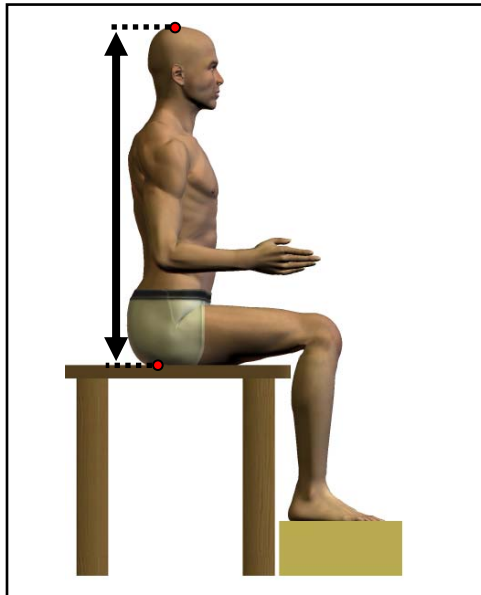
FEMALES		
CM		IN
13.71	MEAN	5.40
0.04	STD ERROR (MEAN)	0.02
1.01	STANDARD DEVIATION	0.40
0.03	STD ERROR (STD DEV)	0.01
11.00	MINIMUM	4.33
16.70	MAXIMUM	6.57
SKEWNESS		0.05
KURTOSIS		2.91
COEFFICIENT OF VARIATION		7.4%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
14.83	MEAN	5.84
0.03	STD ERROR (MEAN)	0.01
1.06	STANDARD DEVIATION	0.42
0.02	STD ERROR (STD DEV)	0.01
11.20	MINIMUM	4.41
18.60	MAXIMUM	7.32
SKEWNESS		0.24
KURTOSIS		2.96
COEFFICIENT OF VARIATION		7.1%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
3	0.48	3	0.48	10.95	-	11.15		1	0.08	1	0.08
3	0.48	6	0.97	11.15	-	11.35		0	0.00	1	0.08
2	0.32	8	1.29	11.35	-	11.55		1	0.08	2	0.15
7	1.13	15	2.42	11.55	-	11.75		0	0.00	2	0.15
10	1.61	25	4.03	11.75	-	11.95		2	0.15	4	0.31
16	2.58	41	6.61	11.95	-	12.15		0	0.00	4	0.31
14	2.26	55	8.87	12.15	-	12.35		6	0.46	10	0.77
20	3.23	75	12.10	12.35	-	12.55		7	0.54	17	1.31
31	5.00	106	17.10	12.55	-	12.75		13	1.00	30	2.31
31	5.00	137	22.10	12.75	-	12.95		34	2.61	64	4.92
44	7.10	181	29.19	12.95	-	13.15		31	2.38	95	7.30
40	6.45	221	35.65	13.15	-	13.35		58	4.46	153	11.76
58	9.35	279	45.00	13.35	-	13.55		54	4.15	207	15.91
44	7.10	323	52.10	13.55	-	13.75		63	4.84	270	20.75
41	6.61	364	58.71	13.75	-	13.95		88	6.76	358	27.52
53	8.55	417	67.26	13.95	-	14.15		84	6.46	442	33.97
35	5.65	452	72.90	14.15	-	14.35		89	6.84	531	40.81
51	8.23	503	81.13	14.35	-	14.55		103	7.92	634	48.73
22	3.55	525	84.68	14.55	-	14.75		94	7.23	728	55.96
24	3.87	549	88.55	14.75	-	14.95		109	8.38	837	64.34
23	3.71	572	92.26	14.95	-	15.15		85	6.53	922	70.87
19	3.06	591	95.32	15.15	-	15.35		79	6.07	1001	76.94
7	1.13	598	96.45	15.35	-	15.55		51	3.92	1052	80.86
5	0.81	603	97.26	15.55	-	15.75		39	3.00	1091	83.86
5	0.81	608	98.06	15.75	-	15.95		56	4.30	1147	88.16
6	0.97	614	99.03	15.95	-	16.15		45	3.46	1192	91.62
2	0.32	616	99.35	16.15	-	16.35		28	2.15	1220	93.77
3	0.48	619	99.84	16.35	-	16.55		19	1.46	1239	95.23
1	0.16	620	100.00	16.55	-	16.75		25	1.92	1264	97.16
				16.75	-	16.95		15	1.15	1279	98.31
				16.95	-	17.15		8	0.61	1287	98.92
				17.15	-	17.35		4	0.31	1291	99.23
				17.35	-	17.55		5	0.38	1296	99.62
				17.55	-	17.75		1	0.08	1297	99.69
				17.75	-	17.95		2	0.15	1299	99.85
				17.95	-	18.15		1	0.08	1300	99.92
				18.15	-	18.35		0	0.00	1300	99.92
				18.35	-	18.55		1	0.08	1301	100.00
				18.55	-	18.75					

(72) SITTING HEIGHT

The vertical distance between a sitting surface and the top of the head is measured with an anthropometer. The participant sits erect with the head in the Frankfurt plane. The shoulders and upper arms are relaxed, and the forearms and hands are extended forward horizontally with the palms facing each other. The thighs are parallel, and the knees are flexed 90° with the feet in line with the thighs. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
78.02	30.72	1ST	84.01	33.07
79.03	31.11	2ND	84.60	33.31
79.96	31.49	3RD	85.40	33.62
80.50	31.69	5TH	86.01	33.86
81.81	32.20	10TH	87.40	34.41
82.60	32.52	15TH	88.30	34.76
83.10	32.72	20TH	88.90	35.00
83.70	32.95	25TH	89.50	35.24
84.10	33.11	30TH	90.00	35.43
84.70	33.35	35TH	90.50	35.63
85.10	33.50	40TH	90.88	35.78
85.40	33.62	45TH	91.40	35.98
85.90	33.82	50TH	91.80	36.14
86.30	33.98	55TH	92.21	36.30
86.70	34.13	60TH	92.80	36.54
87.07	34.28	65TH	93.30	36.73
87.50	34.45	70TH	93.80	36.93
87.90	34.61	75TH	94.30	37.13
88.68	34.91	80TH	94.90	37.36
89.20	35.12	85TH	95.60	37.64
90.19	35.51	90TH	96.60	38.03
91.40	35.98	95TH	97.80	38.50
92.14	36.27	97TH	98.70	38.86
92.89	36.57	98TH	99.50	39.17
94.08	37.04	99TH	100.50	39.57

(72) SITTING HEIGHT

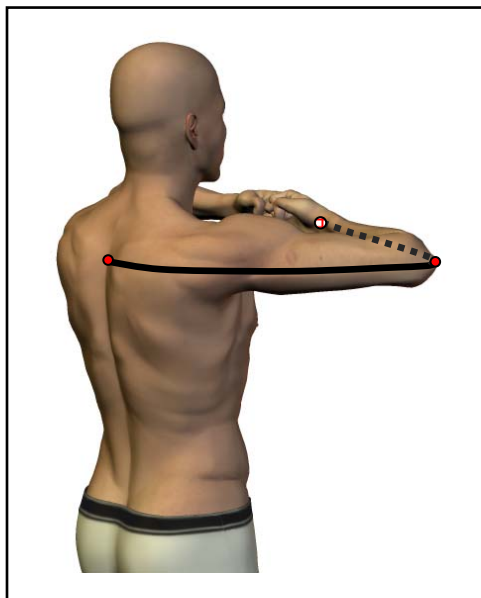
FEMALES		
<u>CM</u>		<u>IN</u>
85.90	MEAN	33.82
0.13	STD ERROR (MEAN)	0.05
3.26	STANDARD DEVIATION	1.28
0.09	STD ERROR (STD DEV)	0.04
76.10	MINIMUM	29.96
96.20	MAXIMUM	37.87
SKEWNESS		0.08
KURTOSIS		3.03
COEFFICIENT OF VARIATION		3.8%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
91.91	MEAN	36.19
0.10	STD ERROR (MEAN)	0.04
3.56	STANDARD DEVIATION	1.40
0.07	STD ERROR (STD DEV)	0.03
81.40	MINIMUM	32.05
103.70	MAXIMUM	40.83
SKEWNESS		0.09
KURTOSIS		2.95
COEFFICIENT OF VARIATION		3.9%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	75.55	-	76.55					
1	0.16	2	0.32	76.55	-	77.55					
6	0.97	8	1.29	77.55	-	78.55					
6	0.97	14	2.26	78.55	-	79.55					
18	2.90	32	5.16	79.55	-	80.55					
20	3.23	52	8.39	80.55	-	81.55		1	0.08	1	0.08
40	6.45	92	14.84	81.55	-	82.55		5	0.38	6	0.46
49	7.90	141	22.74	82.55	-	83.55		2	0.15	8	0.61
66	10.65	207	33.39	83.55	-	84.55		17	1.31	25	1.92
79	12.74	286	46.13	84.55	-	85.55		18	1.38	43	3.31
78	12.58	364	58.71	85.55	-	86.55		47	3.61	90	6.92
77	12.42	441	71.13	86.55	-	87.55		52	4.00	142	10.91
54	8.71	495	79.84	87.55	-	88.55		78	6.00	220	16.91
46	7.42	541	87.26	88.55	-	89.55		117	8.99	337	25.90
30	4.84	571	92.10	89.55	-	90.55		130	9.99	467	35.90
24	3.87	595	95.97	90.55	-	91.55		140	10.76	607	46.66
10	1.61	605	97.58	91.55	-	92.55		148	11.38	755	58.03
6	0.97	611	98.55	92.55	-	93.55		134	10.30	889	68.33
6	0.97	617	99.52	93.55	-	94.55		119	9.15	1008	77.48
2	0.32	619	99.84	94.55	-	95.55		96	7.38	1104	84.86
1	0.16	620	100.00	95.55	-	96.55		65	5.00	1169	89.85
				96.55	-	97.55		55	4.23	1224	94.08
				97.55	-	98.55		31	2.38	1255	96.46
				98.55	-	99.55		21	1.61	1276	98.08
				99.55	-	100.55		14	1.08	1290	99.15
				100.55	-	101.55		6	0.46	1296	99.62
				101.55	-	102.55		3	0.23	1299	99.85
				102.55	-	103.55		1	0.08	1300	99.92
				103.55	-	104.55		1	0.08	1301	100.00

(73) SLEEVE LENGTH: SPINE-WRIST

The horizontal surface distance from the midspine landmark, across the olecranon, center landmark at the tip of the raised right elbow, to the dorsal stylium landmark is measured with a tape. The measurement is taken while the participant holds his/her arms up in a horizontal position parallel to the standing surface and joins them by bringing the fists together at the metacarpophalangeal and proximal interphalangeal knuckles. The forearms and fists are in a straight line.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
72.70	28.62	1ST	79.21	31.18
73.40	28.90	2ND	80.50	31.69
74.00	29.13	3RD	81.20	31.97
74.50	29.33	5TH	82.10	32.32
75.50	29.72	10TH	83.50	32.87
76.20	30.00	15TH	84.20	33.15
76.70	30.20	20TH	84.90	33.43
77.30	30.43	25TH	85.50	33.66
77.90	30.67	30TH	86.10	33.90
78.50	30.91	35TH	86.70	34.13
79.00	31.10	40TH	87.20	34.33
79.40	31.26	45TH	87.70	34.53
79.95	31.48	50TH	88.30	34.76
80.30	31.61	55TH	88.80	34.96
80.80	31.81	60TH	89.20	35.12
81.20	31.97	65TH	89.90	35.39
81.60	32.13	70TH	90.50	35.63
82.10	32.32	75TH	91.00	35.83
82.78	32.59	80TH	91.70	36.10
83.59	32.90	85TH	92.50	36.42
84.49	33.27	90TH	93.68	36.88
85.80	33.78	95TH	95.00	37.40
86.24	33.95	97TH	96.09	37.83
87.06	34.27	98TH	96.70	38.07
88.50	34.84	99TH	97.80	38.50

(73) SLEEVE LENGTH: SPINE-WRIST

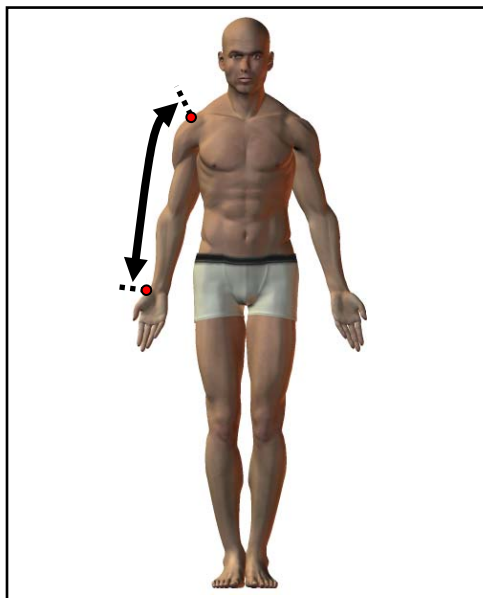
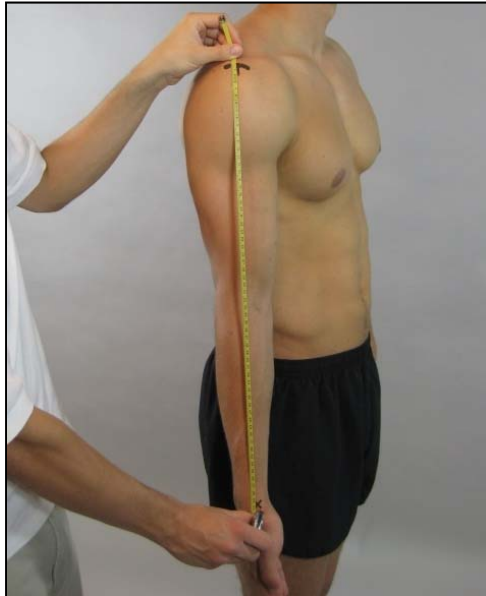
FEMALES		
<u>CM</u>		<u>IN</u>
79.89	MEAN	31.45
0.14	STD ERROR (MEAN)	0.05
3.44	STANDARD DEVIATION	1.35
0.10	STD ERROR (STD DEV)	0.04
71.90	MINIMUM	28.31
92.40	MAXIMUM	36.38
SKEWNESS		0.25
KURTOSIS		2.96
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
88.37	MEAN	34.79
0.11	STD ERROR (MEAN)	0.04
3.93	STANDARD DEVIATION	1.55
0.08	STD ERROR (STD DEV)	0.03
77.30	MINIMUM	30.43
101.20	MAXIMUM	39.84
SKEWNESS		0.13
KURTOSIS		2.78
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
5	0.81	5	0.81	71.55	-	72.55					
9	1.45	14	2.26	72.55	-	73.55					
21	3.39	35	5.65	73.55	-	74.55					
30	4.84	65	10.48	74.55	-	75.55					
50	8.06	115	18.55	75.55	-	76.55					
54	8.71	169	27.26	76.55	-	77.55		2	0.15	2	0.15
59	9.52	228	36.77	77.55	-	78.55		3	0.23	5	0.38
68	10.97	296	47.74	78.55	-	79.55		8	0.61	13	1.00
65	10.48	361	58.23	79.55	-	80.55		13	1.00	26	2.00
67	10.81	428	69.03	80.55	-	81.55		20	1.54	46	3.54
59	9.52	487	78.55	81.55	-	82.55		35	2.69	81	6.23
40	6.45	527	85.00	82.55	-	83.55		52	4.00	133	10.22
38	6.13	565	91.13	83.55	-	84.55		93	7.15	226	17.37
22	3.55	587	94.68	84.55	-	85.55		103	7.92	329	25.29
17	2.74	604	97.42	85.55	-	86.55		112	8.61	441	33.90
8	1.29	612	98.71	86.55	-	87.55		121	9.30	562	43.20
3	0.48	615	99.19	87.55	-	88.55		123	9.45	685	52.65
1	0.16	616	99.35	88.55	-	89.55		133	10.22	818	62.87
2	0.32	618	99.68	89.55	-	90.55		111	8.53	929	71.41
1	0.16	619	99.84	90.55	-	91.55		101	7.76	1030	79.17
1	0.16	620	100.00	91.55	-	92.55		79	6.07	1109	85.24
				92.55	-	93.55		58	4.46	1167	89.70
				93.55	-	94.55		52	4.00	1219	93.70
				94.55	-	95.55		32	2.46	1251	96.16
				95.55	-	96.55		23	1.77	1274	97.92
				96.55	-	97.55		13	1.00	1287	98.92
				97.55	-	98.55		9	0.69	1296	99.62
				98.55	-	99.55		4	0.31	1300	99.92
				99.55	-	100.55		0	0.00	1300	99.92
				100.55	-	101.55		1	0.08	1301	100.00

(74) SLEEVE OUTSEAM

The straight-line distance between the right acromion landmark and the stylium landmark is measured with a tape. The participant stands erect with both arms straight at the sides with the hands straight and the palms facing forward.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
48.52	19.10	1ST	52.20	20.55
49.00	19.29	2ND	52.80	20.79
49.40	19.45	3RD	53.50	21.06
50.00	19.69	5TH	54.21	21.34
51.10	20.12	10TH	55.30	21.77
51.50	20.28	15TH	55.93	22.02
52.00	20.47	20TH	56.40	22.20
52.50	20.67	25TH	56.90	22.40
52.80	20.79	30TH	57.30	22.56
53.24	20.95	35TH	57.70	22.72
53.50	21.06	40TH	58.10	22.87
53.90	21.22	45TH	58.50	23.03
54.20	21.34	50TH	58.90	23.19
54.50	21.46	55TH	59.20	23.31
55.00	21.65	60TH	59.50	23.43
55.50	21.85	65TH	60.00	23.62
55.90	22.01	70TH	60.50	23.82
56.18	22.12	75TH	61.00	24.02
56.58	22.27	80TH	61.50	24.21
57.00	22.44	85TH	62.17	24.48
57.80	22.76	90TH	63.00	24.80
59.00	23.23	95TH	64.20	25.28
59.50	23.43	97TH	64.70	25.47
60.60	23.86	98TH	65.50	25.79
61.46	24.19	99TH	66.20	26.06

(74) SLEEVE OUTSEAM

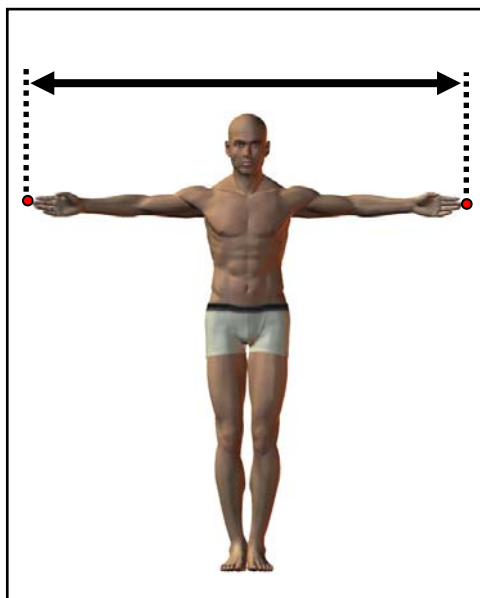
FEMALES		
<u>CM</u>		<u>IN</u>
54.34	MEAN	21.39
0.11	STD ERROR (MEAN)	0.04
2.71	STANDARD DEVIATION	1.07
0.08	STD ERROR (STD DEV)	0.03
46.80	MINIMUM	18.43
62.90	MAXIMUM	24.76
SKEWNESS		0.20
KURTOSIS		3.03
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
58.97	MEAN	23.22
0.08	STD ERROR (MEAN)	0.03
3.02	STANDARD DEVIATION	1.19
0.06	STD ERROR (STD DEV)	0.02
49.70	MINIMUM	19.57
70.10	MAXIMUM	27.60
SKEWNESS		0.16
KURTOSIS		2.98
COEFFICIENT OF VARIATION		5.1%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
3	0.48	3	0.48	46.55	-	47.55					
3	0.48	6	0.97	47.55	-	48.55					
15	2.42	21	3.39	48.55	-	49.55					
24	3.87	45	7.26	49.55	-	50.55	1	0.08	1	0.08	
53	8.55	98	15.81	50.55	-	51.55	7	0.54	8	0.61	
70	11.29	168	27.10	51.55	-	52.55	14	1.08	22	1.69	
85	13.71	253	40.81	52.55	-	53.55	23	1.77	45	3.46	
96	15.48	349	56.29	53.55	-	54.55	32	2.46	77	5.92	
66	10.65	415	66.94	54.55	-	55.55	87	6.69	164	12.61	
81	13.06	496	80.00	55.55	-	56.55	125	9.61	289	22.21	
51	8.23	547	88.23	56.55	-	57.55	140	10.76	429	32.97	
36	5.81	583	94.03	57.55	-	58.55	169	12.99	598	45.96	
20	3.23	603	97.26	58.55	-	59.55	195	14.99	793	60.95	
4	0.65	607	97.90	59.55	-	60.55	136	10.45	929	71.41	
8	1.29	615	99.19	60.55	-	61.55	115	8.84	1044	80.25	
4	0.65	619	99.84	61.55	-	62.55	99	7.61	1143	87.86	
1	0.16	620	100.00	62.55	-	63.55	69	5.30	1212	93.16	
				63.55	-	64.55	46	3.54	1258	96.69	
				64.55	-	65.55	22	1.69	1280	98.39	
				65.55	-	66.55	12	0.92	1292	99.31	
				66.55	-	67.55	6	0.46	1298	99.77	
				67.55	-	68.55	1	0.08	1299	99.85	
				68.55	-	69.55	1	0.08	1300	99.92	
				69.55	-	70.55	1	0.08	1301	100.00	

(75) SPAN

The distance between the tips of the middle fingers (dactylion III) of the horizontally outstretched arms is measured on a wall chart. The participant stands erect with the back against a wall-mounted scale and the heels together. Both arms and hands are stretched horizontally along the wall with the tip of the middle finger of one hand just touching a side wall. A block is placed at the tip of the middle finger of the other hand to establish the measurement on the scale. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
150.42	59.22	1ST	163.00	64.17
151.24	59.55	2ND	165.30	65.08
152.50	60.04	3RD	167.20	65.83
153.70	60.51	5TH	168.91	66.50
155.60	61.26	10TH	171.20	67.40
157.20	61.89	15TH	172.60	67.95
158.50	62.40	20TH	174.00	68.50
159.70	62.87	25TH	175.40	69.06
161.00	63.39	30TH	176.80	69.61
162.00	63.78	35TH	177.70	69.96
163.00	64.17	40TH	178.64	70.33
163.80	64.49	45TH	179.80	70.79
164.90	64.92	50TH	180.90	71.22
165.90	65.31	55TH	181.90	71.61
166.90	65.71	60TH	182.90	72.01
168.10	66.18	65TH	184.20	72.52
169.50	66.73	70TH	185.20	72.91
170.30	67.05	75TH	186.60	73.46
171.60	67.56	80TH	187.90	73.98
172.90	68.07	85TH	189.50	74.61
174.90	68.86	90TH	192.19	75.67
178.10	70.12	95TH	195.20	76.85
179.42	70.64	97TH	197.09	77.60
181.14	71.32	98TH	198.49	78.15
184.74	72.74	99TH	200.60	78.98

(75) SPAN

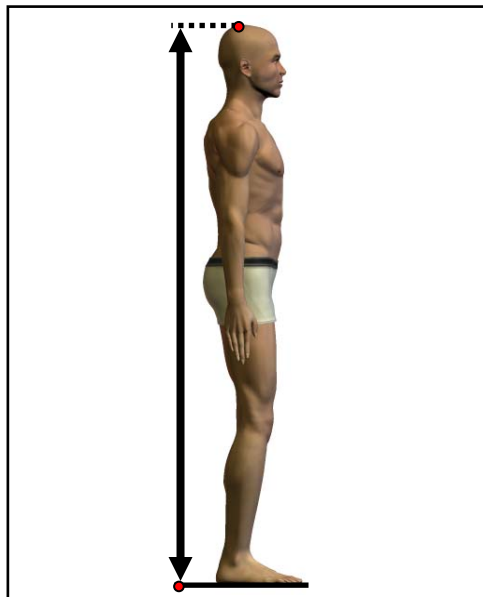
FEMALES		
CM		IN
165.25	MEAN	65.06
0.30	STD ERROR (MEAN)	0.12
7.48	STANDARD DEVIATION	2.94
0.21	STD ERROR (STD DEV)	0.08
146.00	MINIMUM	57.48
191.90	MAXIMUM	75.55
SKEWNESS		0.28
KURTOSIS		2.91
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		619

MALES		
CM		IN
181.19	MEAN	71.33
0.22	STD ERROR (MEAN)	0.09
8.06	STANDARD DEVIATION	3.17
0.16	STD ERROR (STD DEV)	0.06
154.60	MINIMUM	60.87
206.50	MAXIMUM	81.30
SKEWNESS		0.18
KURTOSIS		2.89
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES		MALES			
E	FPct	CumF	CumFPct	CM		E	FPct	CumF	CumFPct
1	0.16	1	0.16	145.75	-	147.25			
1	0.16	2	0.32	147.25	-	148.75			
1	0.16	3	0.48	148.75	-	150.25			
11	1.78	14	2.26	150.25	-	151.75			
13	2.10	27	4.36	151.75	-	153.25			
25	4.04	52	8.40	153.25	-	154.75	1	0.08	0.08
21	3.39	73	11.79	154.75	-	156.25	0	0.00	0.08
30	4.85	103	16.64	156.25	-	157.75	0	0.00	0.08
39	6.30	142	22.94	157.75	-	159.25	1	0.08	0.15
34	5.49	176	28.43	159.25	-	160.75	3	0.23	0.38
45	7.27	221	35.70	160.75	-	162.25	5	0.38	0.77
55	8.89	276	44.59	162.25	-	163.75	5	0.38	1.15
48	7.75	324	52.34	163.75	-	165.25	9	0.69	1.85
42	6.79	366	59.13	165.25	-	166.75	8	0.62	2.46
42	6.79	408	65.91	166.75	-	168.25	16	1.23	3.69
36	5.82	444	71.73	168.25	-	169.75	34	2.62	6.31
46	7.43	490	79.16	169.75	-	171.25	49	3.77	10.08
33	5.33	523	84.49	171.25	-	172.75	71	5.46	15.54
26	4.20	549	88.69	172.75	-	174.25	71	5.46	21.00
18	2.91	567	91.60	174.25	-	175.75	69	5.31	26.31
11	1.78	578	93.38	175.75	-	177.25	73	5.62	31.92
16	2.58	594	95.96	177.25	-	178.75	112	8.62	40.54
9	1.45	603	97.42	178.75	-	180.25	89	6.85	47.38
7	1.13	610	98.55	180.25	-	181.75	84	6.46	53.85
1	0.16	611	98.71	181.75	-	183.25	92	7.08	60.92
2	0.32	613	99.03	183.25	-	184.75	88	6.77	67.69
4	0.65	617	99.68	184.75	-	186.25	79	6.08	73.77
0	0.00	617	99.68	186.25	-	187.75	74	5.69	79.46
0	0.00	617	99.68	187.75	-	189.25	60	4.62	84.08
1	0.16	618	99.84	189.25	-	190.75	44	3.38	87.46
1	0.16	619	100.00	190.75	-	192.25	35	2.69	90.15
				192.25	-	193.75	34	2.62	92.77
				193.75	-	195.25	31	2.38	95.15
				195.25	-	196.75	19	1.46	96.62
				196.75	-	198.25	18	1.38	98.00
				198.25	-	199.75	7	0.54	98.54
				199.75	-	201.25	9	0.69	99.23
				201.25	-	202.75	4	0.31	99.54
				202.75	-	204.25	4	0.31	99.85
				204.25	-	205.75	0	0.00	99.85
				205.75	-	207.25	2	0.15	100.00

(76) STATURE

The vertical distance from a standing surface to the top of the head is measured with an anthropometer. The participant stands erect with the head in the Frankfurt plane. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
149.12	58.71	1ST	160.61	63.23
150.44	59.23	2ND	161.80	63.70
150.86	59.40	3RD	163.00	64.17
152.31	59.96	5TH	164.70	64.84
154.30	60.75	10TH	166.50	65.55
155.72	61.31	15TH	167.73	66.03
156.80	61.73	20TH	169.30	66.65
158.03	62.21	25TH	170.75	67.22
159.30	62.72	30TH	171.70	67.60
160.20	63.07	35TH	172.50	67.91
161.00	63.39	40TH	173.28	68.22
161.80	63.70	45TH	174.30	68.62
162.60	64.02	50TH	175.00	68.90
163.20	64.25	55TH	175.90	69.25
164.00	64.57	60TH	176.70	69.57
164.77	64.87	65TH	177.50	69.88
165.50	65.16	70TH	178.64	70.33
166.48	65.54	75TH	179.80	70.79
167.80	66.06	80TH	181.30	71.38
169.10	66.57	85TH	182.77	71.96
170.59	67.17	90TH	184.98	72.82
173.50	68.31	95TH	187.30	73.74
174.67	68.77	97TH	189.20	74.49
175.50	69.09	98TH	190.50	75.00
177.05	69.70	99TH	192.10	75.63

(76) STATURE

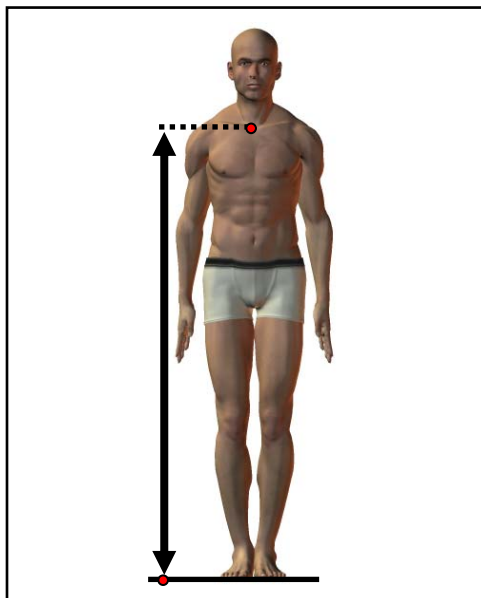
FEMALES		
<u>CM</u>		<u>IN</u>
162.49	MEAN	63.97
0.25	STD ERROR (MEAN)	0.10
6.22	STANDARD DEVIATION	2.45
0.18	STD ERROR (STD DEV)	0.07
145.40	MINIMUM	57.24
180.40	MAXIMUM	71.02
SKEWNESS		0.09
KURTOSIS		2.75
COEFFICIENT OF VARIATION		3.8%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
175.34	MEAN	69.03
0.19	STD ERROR (MEAN)	0.08
6.97	STANDARD DEVIATION	2.75
0.14	STD ERROR (STD DEV)	0.05
151.80	MINIMUM	59.76
197.50	MAXIMUM	77.76
SKEWNESS		0.19
KURTOSIS		2.92
COEFFICIENT OF VARIATION		4.0%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.16	1	0.16	144.25	-	145.75					
1	0.16	2	0.32	145.75	-	147.25					
0	0.00	2	0.32	147.25	-	148.75					
9	1.45	11	1.77	148.75	-	150.25					
14	2.26	25	4.03	150.25	-	151.75					
17	2.74	42	6.77	151.75	-	153.25	1	0.08	1	0.08	
27	4.35	69	11.13	153.25	-	154.75	1	0.08	2	0.15	
40	6.45	109	17.58	154.75	-	156.25	2	0.15	4	0.31	
37	5.97	146	23.55	156.25	-	157.75	1	0.08	5	0.38	
39	6.29	185	29.84	157.75	-	159.25	1	0.08	6	0.46	
48	7.74	233	37.58	159.25	-	160.75	7	0.54	13	1.00	
67	10.81	300	48.39	160.75	-	162.25	17	1.31	30	2.31	
63	10.16	363	58.55	162.25	-	163.75	20	1.54	50	3.84	
56	9.03	419	67.58	163.75	-	165.25	32	2.46	82	6.30	
54	8.71	473	76.29	165.25	-	166.75	63	4.84	145	11.15	
35	5.65	508	81.94	166.75	-	168.25	65	5.00	210	16.14	
33	5.32	541	87.26	168.25	-	169.75	71	5.46	281	21.60	
30	4.84	571	92.10	169.75	-	171.25	82	6.30	363	27.90	
13	2.10	584	94.19	171.25	-	172.75	115	8.84	478	36.74	
15	2.42	599	96.61	172.75	-	174.25	105	8.07	583	44.81	
13	2.10	612	98.71	174.25	-	175.75	123	9.45	706	54.27	
3	0.48	615	99.19	175.75	-	177.25	119	9.15	825	63.41	
1	0.16	616	99.35	177.25	-	178.75	93	7.15	918	70.56	
3	0.48	619	99.84	178.75	-	180.25	79	6.07	997	76.63	
1	0.16	620	100.00	180.25	-	181.75	66	5.07	1063	81.71	
				181.75	-	183.25	64	4.92	1127	86.63	
				183.25	-	184.75	39	3.00	1166	89.62	
				184.75	-	186.25	44	3.38	1210	93.01	
				186.25	-	187.75	35	2.69	1245	95.70	
				187.75	-	189.25	18	1.38	1263	97.08	
				189.25	-	190.75	14	1.08	1277	98.16	
				190.75	-	192.25	12	0.92	1289	99.08	
				192.25	-	193.75	6	0.46	1295	99.54	
				193.75	-	195.25	3	0.23	1298	99.77	
				195.25	-	196.75	2	0.15	1300	99.92	
				196.75	-	198.25	1	0.08	1301	100.00	

(77) SUPRASTERNALE HEIGHT

The vertical distance between a standing surface and the suprasternale landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
120.10	47.28	1ST	130.21	51.26
121.78	47.94	2ND	132.00	51.97
122.92	48.39	3RD	132.61	52.20
123.90	48.78	5TH	133.80	52.68
125.31	49.33	10TH	135.70	53.43
126.50	49.80	15TH	137.10	53.98
127.52	50.21	20TH	138.20	54.41
128.60	50.63	25TH	139.20	54.80
129.60	51.02	30TH	140.20	55.20
130.24	51.27	35TH	140.90	55.47
131.10	51.61	40TH	141.70	55.79
131.90	51.93	45TH	142.60	56.14
132.60	52.20	50TH	143.30	56.42
133.26	52.46	55TH	143.91	56.65
133.76	52.66	60TH	144.70	56.97
134.40	52.91	65TH	145.50	57.28
135.20	53.23	70TH	146.50	57.68
136.18	53.61	75TH	147.35	58.01
137.10	53.98	80TH	148.80	58.58
138.20	54.41	85TH	150.07	59.08
139.50	54.92	90TH	151.80	59.76
141.80	55.83	95TH	154.30	60.75
142.74	56.19	97TH	155.59	61.26
143.92	56.66	98TH	156.88	61.76
146.36	57.63	99TH	158.80	62.52

(77) SUPRASTERNALE HEIGHT

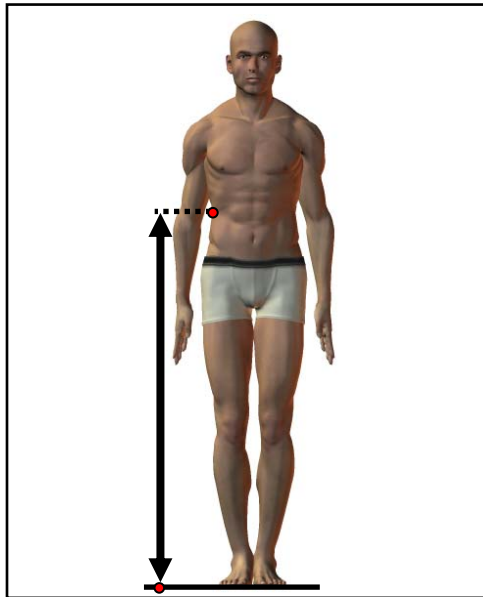
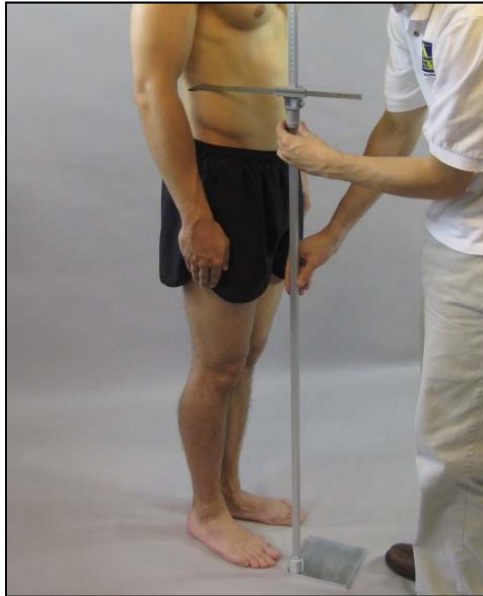
FEMALES		
CM		IN
132.47	MEAN	52.15
0.22	STD ERROR (MEAN)	0.09
5.43	STANDARD DEVIATION	2.14
0.15	STD ERROR (STD DEV)	0.06
118.00	MINIMUM	46.46
149.90	MAXIMUM	59.02
SKEWNESS		0.12
KURTOSIS		2.81
COEFFICIENT OF VARIATION		4.1%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
143.50	MEAN	56.50
0.17	STD ERROR (MEAN)	0.07
6.17	STANDARD DEVIATION	2.43
0.12	STD ERROR (STD DEV)	0.05
123.50	MINIMUM	48.62
163.80	MAXIMUM	64.49
SKEWNESS		0.21
KURTOSIS		2.98
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	117.55	-	118.55					
1	0.16	2	0.32	118.55	-	119.55					
5	0.81	7	1.13	119.55	-	120.55					
4	0.65	11	1.77	120.55	-	121.55					
6	0.97	17	2.74	121.55	-	122.55					
9	1.45	26	4.19	122.55	-	123.55		1	0.08	1	0.08
15	2.42	41	6.61	123.55	-	124.55		0	0.00	1	0.08
27	4.35	68	10.97	124.55	-	125.55		1	0.08	2	0.15
28	4.52	96	15.48	125.55	-	126.55		1	0.08	3	0.23
28	4.52	124	20.00	126.55	-	127.55		1	0.08	4	0.31
30	4.84	154	24.84	127.55	-	128.55		1	0.08	5	0.38
31	5.00	185	29.84	128.55	-	129.55		1	0.08	6	0.46
44	7.10	229	36.94	129.55	-	130.55		7	0.54	13	1.00
37	5.97	266	42.90	130.55	-	131.55		8	0.61	21	1.61
42	6.77	308	49.68	131.55	-	132.55		17	1.31	38	2.92
55	8.87	363	58.55	132.55	-	133.55		24	1.84	62	4.77
51	8.23	414	66.77	133.55	-	134.55		30	2.31	92	7.07
35	5.65	449	72.42	134.55	-	135.55		35	2.69	127	9.76
30	4.84	479	77.26	135.55	-	136.55		44	3.38	171	13.14
28	4.52	507	81.77	136.55	-	137.55		48	3.69	219	16.83
28	4.52	535	86.29	137.55	-	138.55		56	4.30	275	21.14
25	4.03	560	90.32	138.55	-	139.55		75	5.76	350	26.90
18	2.90	578	93.23	139.55	-	140.55		70	5.38	420	32.28
9	1.45	587	94.68	140.55	-	141.55		89	6.84	509	39.12
13	2.10	600	96.77	141.55	-	142.55		75	5.76	584	44.89
6	0.97	606	97.74	142.55	-	143.55		92	7.07	676	51.96
5	0.81	611	98.55	143.55	-	144.55		93	7.15	769	59.11
3	0.48	614	99.03	144.55	-	145.55		82	6.30	851	65.41
0	0.00	614	99.03	145.55	-	146.55		66	5.07	917	70.48
5	0.81	619	99.84	146.55	-	147.55		72	5.53	989	76.02
0	0.00	619	99.84	147.55	-	148.55		45	3.46	1034	79.48
0	0.00	619	99.84	148.55	-	149.55		54	4.15	1088	83.63
1	0.16	620	100.00	149.55	-	150.55		32	2.46	1120	86.09
				150.55	-	151.55		43	3.31	1163	89.39
				151.55	-	152.55		35	2.69	1198	92.08
				152.55	-	153.55		25	1.92	1223	94.00
				153.55	-	154.55		21	1.61	1244	95.62
				154.55	-	155.55		18	1.38	1262	97.00
				155.55	-	156.55		13	1.00	1275	98.00
				156.55	-	157.55		5	0.38	1280	98.39
				157.55	-	158.55		6	0.46	1286	98.85
				158.55	-	159.55		5	0.38	1291	99.23
				159.55	-	160.55		4	0.31	1295	99.54
				160.55	-	161.55		1	0.08	1296	99.62
				161.55	-	162.55		4	0.31	1300	99.92
				162.55	-	163.55		0	0.00	1300	99.92
				163.55	-	164.55		1	0.08	1301	100.00

(78) TENTH RIB HEIGHT

The vertical distance between a standing surface and the tenth rib landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
93.78	36.92	1ST	100.00	39.37
95.04	37.42	2ND	101.00	39.76
95.76	37.71	3RD	101.80	40.08
96.20	37.87	5TH	102.61	40.39
97.70	38.46	10TH	104.32	41.07
98.80	38.90	15TH	105.60	41.57
99.62	39.22	20TH	106.50	41.93
100.60	39.61	25TH	107.40	42.28
101.50	39.96	30TH	108.30	42.64
102.24	40.25	35TH	108.90	42.87
102.90	40.51	40TH	109.50	43.11
103.50	40.75	45TH	110.20	43.39
104.10	40.98	50TH	111.00	43.70
104.50	41.14	55TH	111.80	44.02
105.20	41.42	60TH	112.40	44.25
105.70	41.61	65TH	113.00	44.49
106.40	41.89	70TH	113.80	44.80
107.00	42.13	75TH	114.70	45.16
107.70	42.40	80TH	115.70	45.55
108.49	42.71	85TH	116.70	45.94
109.60	43.15	90TH	118.18	46.53
111.39	43.85	95TH	120.50	47.44
112.34	44.22	97TH	121.69	47.91
113.76	44.79	98TH	122.50	48.23
115.84	45.60	99TH	124.50	49.02

(78) TENTH RIB HEIGHT

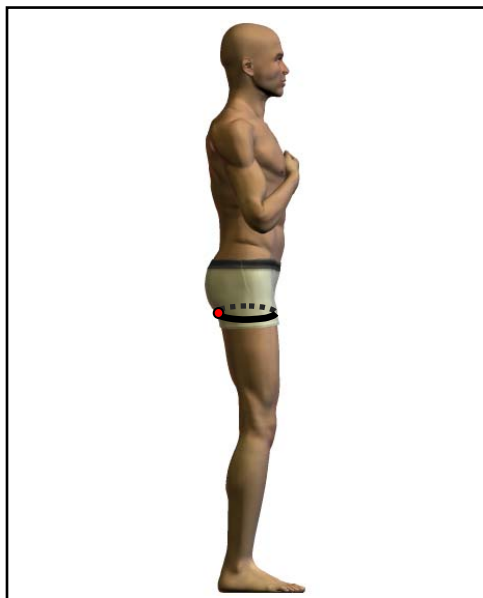
FEMALES		
CM		IN
103.90	MEAN	40.90
0.18	STD ERROR (MEAN)	0.07
4.59	STANDARD DEVIATION	1.81
0.13	STD ERROR (STD DEV)	0.05
92.90	MINIMUM	36.57
117.90	MAXIMUM	46.42
SKEWNESS		0.09
KURTOSIS		2.84
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
111.14	MEAN	43.75
0.15	STD ERROR (MEAN)	0.06
5.36	STANDARD DEVIATION	2.11
0.11	STD ERROR (STD DEV)	0.04
93.20	MINIMUM	36.69
128.80	MAXIMUM	50.71
SKEWNESS		0.18
KURTOSIS		2.94
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				F	FPct	CumF	CumFPct
5	0.81	5	0.81	92.55	-	93.55		1	0.08	1	0.08
4	0.65	9	1.45	93.55	-	94.55		0	0.00	1	0.08
7	1.13	16	2.58	94.55	-	95.55		0	0.00	1	0.08
22	3.55	38	6.13	95.55	-	96.55		2	0.15	3	0.23
18	2.90	56	9.03	96.55	-	97.55		3	0.23	6	0.46
32	5.16	88	14.19	97.55	-	98.55		1	0.08	7	0.54
29	4.68	117	18.87	98.55	-	99.55		3	0.23	10	0.77
37	5.97	154	24.84	99.55	-	100.55		11	0.85	21	1.61
34	5.48	188	30.32	100.55	-	101.55		12	0.92	33	2.54
38	6.13	226	36.45	101.55	-	102.55		27	2.08	60	4.61
56	9.03	282	45.48	102.55	-	103.55		38	2.92	98	7.53
60	9.68	342	55.16	103.55	-	104.55		39	3.00	137	10.53
55	8.87	397	64.03	104.55	-	105.55		51	3.92	188	14.45
44	7.10	441	71.13	105.55	-	106.55		73	5.61	261	20.06
49	7.90	490	79.03	106.55	-	107.55		81	6.23	342	26.29
39	6.29	529	85.32	107.55	-	108.55		77	5.92	419	32.21
27	4.35	556	89.68	108.55	-	109.55		105	8.07	524	40.28
21	3.39	577	93.06	109.55	-	110.55		94	7.23	618	47.50
16	2.58	593	95.65	110.55	-	111.55		79	6.07	697	53.57
11	1.77	604	97.42	111.55	-	112.55		102	7.84	799	61.41
4	0.65	608	98.06	112.55	-	113.55		91	6.99	890	68.41
1	0.16	609	98.23	113.55	-	114.55		75	5.76	965	74.17
4	0.65	613	98.87	114.55	-	115.55		71	5.46	1036	79.63
4	0.65	617	99.52	115.55	-	116.55		60	4.61	1096	84.24
1	0.16	618	99.68	116.55	-	117.55		49	3.77	1145	88.01
2	0.32	620	100.00	117.55	-	118.55		39	3.00	1184	91.01
				118.55	-	119.55		32	2.46	1216	93.47
				119.55	-	120.55		22	1.69	1238	95.16
				120.55	-	121.55		24	1.84	1262	97.00
				121.55	-	122.55		14	1.08	1276	98.08
				122.55	-	123.55		9	0.69	1285	98.77
				123.55	-	124.55		4	0.31	1289	99.08
				124.55	-	125.55		4	0.31	1293	99.39
				125.55	-	126.55		5	0.38	1298	99.77
				126.55	-	127.55		1	0.08	1299	99.85
				127.55	-	128.55		1	0.08	1300	99.92
				128.55	-	129.55		1	0.08	1301	100.00

(79) THIGH CIRCUMFERENCE

The circumference of the right thigh at the gluteal furrow landmark is measured with a tape. The measurement is taken perpendicular to the long axis of the thigh. The participant stands erect with the weight distributed equally on both feet. The legs are spread apart just enough so that the thighs do not touch.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
50.01	19.69	1ST	49.70	19.57
51.03	20.09	2ND	50.70	19.96
52.13	20.52	3RD	51.40	20.24
53.21	20.94	5TH	52.40	20.63
54.71	21.54	10TH	54.30	21.38
55.62	21.90	15TH	55.60	21.89
56.50	22.24	20TH	56.70	22.32
57.23	22.53	25TH	57.50	22.64
57.70	22.72	30TH	58.20	22.91
58.30	22.95	35TH	58.90	23.19
58.90	23.19	40TH	59.70	23.50
59.40	23.39	45TH	60.50	23.82
60.00	23.62	50TH	61.30	24.13
60.50	23.82	55TH	61.90	24.37
61.16	24.08	60TH	62.40	24.57
61.80	24.33	65TH	63.13	24.85
62.40	24.57	70TH	63.80	25.12
63.08	24.83	75TH	64.70	25.47
63.60	25.04	80TH	65.70	25.87
64.40	25.35	85TH	66.80	26.30
65.90	25.94	90TH	68.00	26.77
67.70	26.65	95TH	70.20	27.64
68.84	27.10	97TH	71.70	28.23
69.87	27.51	98TH	72.89	28.70
73.37	28.88	99TH	74.90	29.49

(79) THIGH CIRCUMFERENCE

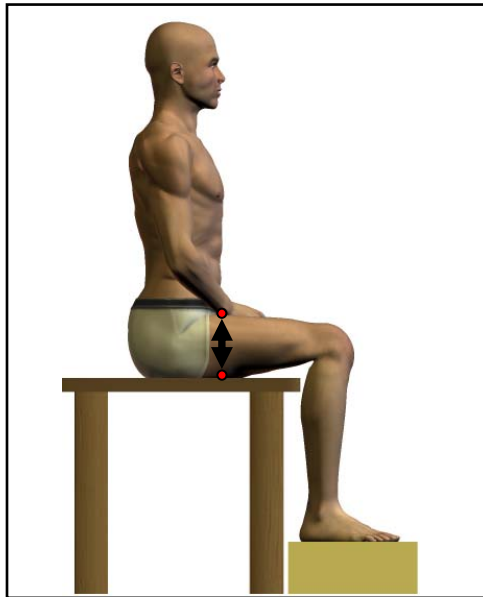
FEMALES		
CM		IN
60.20	MEAN	23.70
0.18	STD ERROR (MEAN)	0.07
4.54	STANDARD DEVIATION	1.79
0.13	STD ERROR (STD DEV)	0.05
48.10	MINIMUM	18.94
82.20	MAXIMUM	32.36
SKEWNESS		0.48
KURTOSIS		4.37
COEFFICIENT OF VARIATION		7.5%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
61.22	MEAN	24.10
0.15	STD ERROR (MEAN)	0.06
5.36	STANDARD DEVIATION	2.11
0.11	STD ERROR (STD DEV)	0.04
46.40	MINIMUM	18.27
79.20	MAXIMUM	31.18
SKEWNESS		0.17
KURTOSIS		2.97
COEFFICIENT OF VARIATION		8.8%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct		CM		E	FPct	CumF	CumFPct	
				45.55	-	46.55	2	0.15	2	0.15	
				46.55	-	47.55	1	0.08	3	0.23	
1	0.16	1	0.16	47.55	-	48.55	2	0.15	5	0.38	
3	0.48	4	0.65	48.55	-	49.55	5	0.38	10	0.77	
4	0.65	8	1.29	49.55	-	50.55	12	0.92	22	1.69	
5	0.81	13	2.10	50.55	-	51.55	20	1.54	42	3.23	
9	1.45	22	3.55	51.55	-	52.55	27	2.08	69	5.30	
16	2.58	38	6.13	52.55	-	53.55	29	2.23	98	7.53	
19	3.06	57	9.19	53.55	-	54.55	45	3.46	143	10.99	
32	5.16	89	14.35	54.55	-	55.55	46	3.54	189	14.53	
40	6.45	129	20.81	55.55	-	56.55	63	4.84	252	19.37	
48	7.74	177	28.55	56.55	-	57.55	78	6.00	330	25.37	
49	7.90	226	36.45	57.55	-	58.55	90	6.92	420	32.28	
64	10.32	290	46.77	58.55	-	59.55	84	6.46	504	38.74	
52	8.39	342	55.16	59.55	-	60.55	83	6.38	587	45.12	
42	6.77	384	61.94	60.55	-	61.55	93	7.15	680	52.27	
56	9.03	440	70.97	61.55	-	62.55	118	9.07	798	61.34	
51	8.23	491	79.19	62.55	-	63.55	83	6.38	881	67.72	
39	6.29	530	85.48	63.55	-	64.55	79	6.07	960	73.79	
22	3.55	552	89.03	64.55	-	65.55	72	5.53	1032	79.32	
18	2.90	570	91.94	65.55	-	66.55	64	4.92	1096	84.24	
18	2.90	588	94.84	66.55	-	67.55	45	3.46	1141	87.70	
11	1.77	599	96.61	67.55	-	68.55	49	3.77	1190	91.47	
8	1.29	607	97.90	68.55	-	69.55	32	2.46	1222	93.93	
5	0.81	612	98.71	69.55	-	70.55	19	1.46	1241	95.39	
2	0.32	614	99.03	70.55	-	71.55	19	1.46	1260	96.85	
0	0.00	614	99.03	71.55	-	72.55	13	1.00	1273	97.85	
0	0.00	614	99.03	72.55	-	73.55	10	0.77	1283	98.62	
1	0.16	615	99.19	73.55	-	74.55	3	0.23	1286	98.85	
3	0.48	618	99.68	74.55	-	75.55	5	0.38	1291	99.23	
0	0.00	618	99.68	75.55	-	76.55	5	0.38	1296	99.62	
0	0.00	618	99.68	76.55	-	77.55	1	0.08	1297	99.69	
0	0.00	618	99.68	77.55	-	78.55	3	0.23	1300	99.92	
0	0.00	618	99.68	78.55	-	79.55	1	0.08	1301	100.00	
0	0.00	618	99.68	79.55	-	80.55					
1	0.16	619	99.84	80.55	-	81.55					
1	0.16	620	100.00	81.55	-	82.55					

(80) THIGH CLEARANCE

The vertical distance between a sitting surface and the thigh point top landmark is measured with an anthropometer. The participant sits with the thighs parallel, the knees flexed 90°, and the feet in line with the thighs.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
14.00	5.51	1ST	15.00	5.91
14.30	5.63	2ND	15.20	5.98
14.56	5.74	3RD	15.40	6.06
14.71	5.79	5TH	15.70	6.18
15.30	6.02	10TH	16.10	6.34
15.60	6.14	15TH	16.50	6.50
15.80	6.22	20TH	16.70	6.57
16.00	6.30	25TH	16.90	6.65
16.10	6.34	30TH	17.20	6.77
16.30	6.42	35TH	17.30	6.81
16.50	6.50	40TH	17.50	6.89
16.60	6.54	45TH	17.70	6.97
16.80	6.61	50TH	17.80	7.01
17.00	6.69	55TH	18.00	7.09
17.10	6.73	60TH	18.20	7.17
17.20	6.77	65TH	18.40	7.24
17.40	6.85	70TH	18.60	7.32
17.50	6.89	75TH	18.90	7.44
17.70	6.97	80TH	19.10	7.52
18.00	7.09	85TH	19.40	7.64
18.30	7.20	90TH	19.70	7.76
18.70	7.36	95TH	20.20	7.95
19.00	7.48	97TH	20.70	8.15
19.16	7.54	98TH	21.00	8.27
19.66	7.74	99TH	21.40	8.43

(80) THIGH CLEARANCE

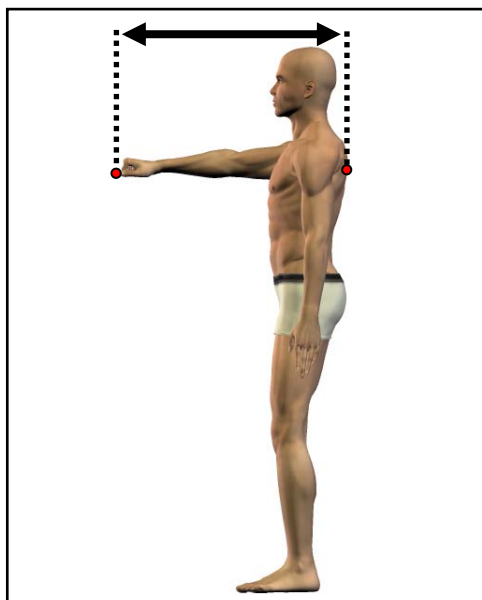
FEMALES		
CM		IN
16.79	MEAN	6.61
0.05	STD ERROR (MEAN)	0.02
1.20	STANDARD DEVIATION	0.47
0.03	STD ERROR (STD DEV)	0.01
13.70	MINIMUM	5.39
22.00	MAXIMUM	8.66
SKEWNESS		0.24
KURTOSIS		3.74
COEFFICIENT OF VARIATION		7.1%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
17.91	MEAN	7.05
0.04	STD ERROR (MEAN)	0.02
1.39	STANDARD DEVIATION	0.55
0.03	STD ERROR (STD DEV)	0.01
14.10	MINIMUM	5.55
23.20	MAXIMUM	9.13
SKEWNESS		0.24
KURTOSIS		3.03
COEFFICIENT OF VARIATION		7.8%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				F	FPct	CumF	CumFPct
2	0.32	2	0.32	13.55	-	13.75					
2	0.32	4	0.65	13.75	-	13.95					
3	0.48	7	1.13	13.95	-	14.15		1	0.08	1	0.08
6	0.97	13	2.10	14.15	-	14.35		1	0.08	2	0.15
5	0.81	18	2.90	14.35	-	14.55		1	0.08	3	0.23
13	2.10	31	5.00	14.55	-	14.75		6	0.46	9	0.69
6	0.97	37	5.97	14.75	-	14.95		3	0.23	12	0.92
14	2.26	51	8.23	14.95	-	15.15		8	0.61	20	1.54
17	2.74	68	10.97	15.15	-	15.35		14	1.08	34	2.61
22	3.55	90	14.52	15.35	-	15.55		21	1.61	55	4.23
31	5.00	121	19.52	15.55	-	15.75		20	1.54	75	5.76
29	4.68	150	24.19	15.75	-	15.95		18	1.38	93	7.15
39	6.29	189	30.48	15.95	-	16.15		38	2.92	131	10.07
34	5.48	223	35.97	16.15	-	16.35		43	3.31	174	13.37
39	6.29	262	42.26	16.35	-	16.55		47	3.61	221	16.99
35	5.65	297	47.90	16.55	-	16.75		43	3.31	264	20.29
42	6.77	339	54.68	16.75	-	16.95		63	4.84	327	25.13
46	7.42	385	62.10	16.95	-	17.15		61	4.69	388	29.82
44	7.10	429	69.19	17.15	-	17.35		80	6.15	468	35.97
43	6.94	472	76.13	17.35	-	17.55		82	6.30	550	42.28
26	4.19	498	80.32	17.55	-	17.75		73	5.61	623	47.89
24	3.87	522	84.19	17.75	-	17.95		72	5.53	695	53.42
24	3.87	546	88.06	17.95	-	18.15		73	5.61	768	59.03
22	3.55	568	91.61	18.15	-	18.35		57	4.38	825	63.41
9	1.45	577	93.06	18.35	-	18.55		59	4.53	884	67.95
15	2.42	592	95.48	18.55	-	18.75		58	4.46	942	72.41
5	0.81	597	96.29	18.75	-	18.95		58	4.46	1000	76.86
11	1.77	608	98.06	18.95	-	19.15		59	4.53	1059	81.40
3	0.48	611	98.55	19.15	-	19.35		46	3.54	1105	84.93
3	0.48	614	99.03	19.35	-	19.55		36	2.77	1141	87.70
1	0.16	615	99.19	19.55	-	19.75		37	2.84	1178	90.55
1	0.16	616	99.35	19.75	-	19.95		33	2.54	1211	93.08
0	0.00	616	99.35	19.95	-	20.15		18	1.38	1229	94.47
1	0.16	617	99.52	20.15	-	20.35		16	1.23	1245	95.70
0	0.00	617	99.52	20.35	-	20.55		10	0.77	1255	96.46
0	0.00	617	99.52	20.55	-	20.75		9	0.69	1264	97.16
0	0.00	617	99.52	20.75	-	20.95		11	0.85	1275	98.00
0	0.00	617	99.52	20.95	-	21.15		4	0.31	1279	98.31
0	0.00	617	99.52	21.15	-	21.35		8	0.61	1287	98.92
2	0.32	619	99.84	21.35	-	21.55		4	0.31	1291	99.23
0	0.00	619	99.84	21.55	-	21.75		1	0.08	1292	99.31
0	0.00	619	99.84	21.75	-	21.95		3	0.23	1295	99.54
1	0.16	620	100.00	21.95	-	22.15		4	0.31	1299	99.85
				22.15	-	22.35		0	0.00	1299	99.85
				22.35	-	22.55		0	0.00	1299	99.85
				22.55	-	22.75		1	0.08	1300	99.92
				22.75	-	22.95		0	0.00	1300	99.85
				22.95	-	23.15		0	0.00	1300	99.85
				23.15	-	23.35		1	0.08	1301	100.00

(81) THUMB TIP REACH

The horizontal distance from a back wall to the tip of the right thumb is measured on a wall scale. The participant stands erect in a corner, looking straight ahead with the feet together and the heels 20 cm from the back wall. The buttocks and shoulders are against the wall. The right arm and hand, palm down, are stretched forward horizontally along a scale on the side wall. The thumb continues the horizontal line of the arm, and the remaining fingers curve around to form a fist. The participant's right shoulder is held against the rear wall.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
66.03	25.99	1ST	71.30	28.07
66.94	26.36	2ND	71.90	28.31
67.40	26.54	3RD	72.50	28.54
68.00	26.77	5TH	73.10	28.78
69.00	27.17	10TH	74.60	29.37
69.90	27.52	15TH	75.60	29.76
70.40	27.72	20TH	76.30	30.04
70.90	27.91	25TH	76.90	30.28
71.50	28.15	30TH	77.30	30.43
72.00	28.35	35TH	77.90	30.67
72.50	28.54	40TH	78.30	30.83
72.80	28.66	45TH	78.70	30.98
73.20	28.82	50TH	79.00	31.10
73.70	29.02	55TH	79.60	31.34
74.00	29.13	60TH	80.10	31.54
74.60	29.37	65TH	80.70	31.77
75.10	29.57	70TH	81.40	32.05
75.60	29.76	75TH	81.90	32.24
76.30	30.04	80TH	82.70	32.56
76.90	30.28	85TH	83.69	32.94
77.60	30.55	90TH	84.59	33.31
78.90	31.06	95TH	86.40	34.02
79.54	31.32	97TH	87.10	34.29
79.96	31.48	98TH	87.90	34.61
81.90	32.24	99TH	89.40	35.20

(81) THUMB TIP REACH

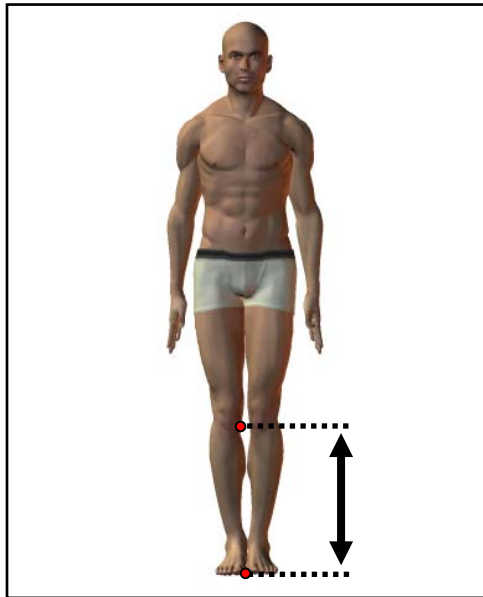
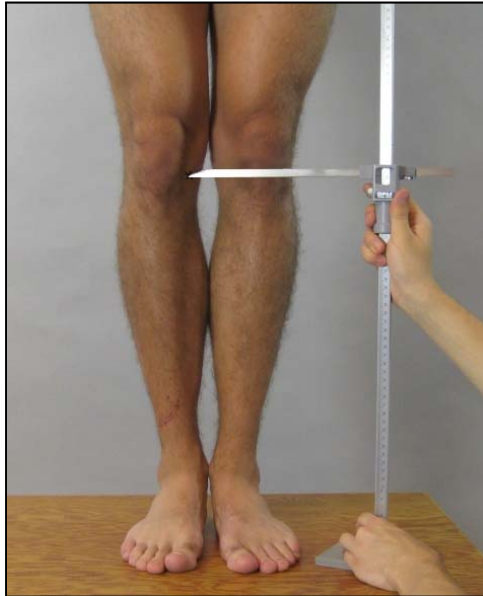
FEMALES		
<u>CM</u>		<u>IN</u>
73.32	MEAN	28.87
0.13	STD ERROR (MEAN)	0.05
3.31	STANDARD DEVIATION	1.30
0.09	STD ERROR (STD DEV)	0.04
64.30	MINIMUM	25.31
83.90	MAXIMUM	33.03
SKEWNESS		0.14
KURTOSIS		2.83
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		619

MALES		
<u>CM</u>		<u>IN</u>
79.44	MEAN	31.28
0.11	STD ERROR (MEAN)	0.04
3.90	STANDARD DEVIATION	1.54
0.08	STD ERROR (STD DEV)	0.03
68.20	MINIMUM	26.85
92.60	MAXIMUM	36.46
SKEWNESS		0.26
KURTOSIS		3.06
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	63.55	-	64.55					
3	0.48	4	0.65	64.55	-	65.55					
4	0.65	8	1.29	65.55	-	66.55					
13	2.10	21	3.39	66.55	-	67.55					
30	4.85	51	8.24	67.55	-	68.55		1	0.08	1	0.08
26	4.20	77	12.44	68.55	-	69.55		2	0.15	3	0.23
56	9.05	133	21.49	69.55	-	70.55		7	0.54	10	0.77
55	8.89	188	30.37	70.55	-	71.55		4	0.31	14	1.08
68	10.99	256	41.36	71.55	-	72.55		30	2.31	44	3.38
79	12.76	335	54.12	72.55	-	73.55		34	2.62	78	6.00
63	10.18	398	64.30	73.55	-	74.55		51	3.92	129	9.92
60	9.69	458	73.99	74.55	-	75.55		64	4.92	193	14.85
54	8.72	512	82.71	75.55	-	76.55		92	7.08	285	21.92
44	7.11	556	89.82	76.55	-	77.55		127	9.77	412	31.69
25	4.04	581	93.86	77.55	-	78.55		147	11.31	559	43.00
20	3.23	601	97.09	78.55	-	79.55		154	11.85	713	54.85
8	1.29	609	98.38	79.55	-	80.55		109	8.38	822	63.23
4	0.65	613	99.03	80.55	-	81.55		106	8.15	928	71.38
5	0.81	618	99.84	81.55	-	82.55		100	7.69	1028	79.08
0	0.00	618	99.84	82.55	-	83.55		72	5.54	1100	84.62
1	0.16	619	100.00	83.55	-	84.55		70	5.38	1170	90.00
				84.55	-	85.55		40	3.08	1210	93.08
				85.55	-	86.55		31	2.38	1241	95.46
				86.55	-	87.55		25	1.92	1266	97.38
				87.55	-	88.55		15	1.15	1281	98.54
				88.55	-	89.55		7	0.54	1288	99.08
				89.55	-	90.55		6	0.46	1294	99.54
				90.55	-	91.55		3	0.23	1297	99.77
				91.55	-	92.55		1	0.08	1298	99.85
				92.55	-	93.55		2	0.15	1300	100.00

(82) TIBIAL HEIGHT

The vertical distance between a standing surface and the tibiale landmark is measured with an anthropometer. The participant stands erect on a table with the feet together and the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
39.12	15.40	1ST	42.11	16.57
39.84	15.69	2ND	43.00	16.93
40.06	15.78	3RD	43.31	17.05
40.50	15.94	5TH	43.80	17.24
41.40	16.30	10TH	44.60	17.56
41.80	16.46	15TH	45.10	17.76
42.20	16.61	20TH	45.60	17.95
42.60	16.77	25TH	46.00	18.11
42.83	16.86	30TH	46.40	18.27
43.20	17.01	35TH	46.70	18.39
43.60	17.17	40TH	47.10	18.54
43.90	17.28	45TH	47.40	18.66
44.30	17.44	50TH	47.80	18.82
44.50	17.52	55TH	48.10	18.94
44.80	17.64	60TH	48.30	19.02
45.10	17.76	65TH	48.70	19.17
45.40	17.87	70TH	49.10	19.33
45.70	17.99	75TH	49.60	19.53
46.10	18.15	80TH	50.00	19.69
46.79	18.42	85TH	50.70	19.96
47.30	18.62	90TH	51.20	20.16
48.00	18.90	95TH	52.39	20.63
48.74	19.18	97TH	53.09	20.91
49.56	19.51	98TH	53.50	21.06
50.18	19.75	99TH	54.20	21.34

(82) TIBIAL HEIGHT

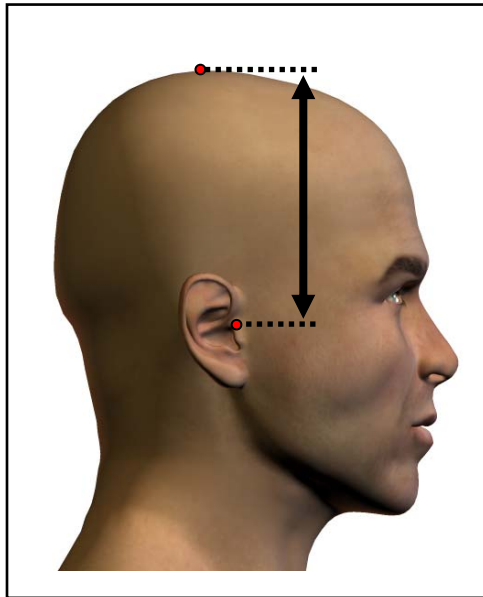
FEMALES		
CM		IN
44.24	MEAN	17.42
0.09	STD ERROR (MEAN)	0.04
2.34	STANDARD DEVIATION	0.92
0.07	STD ERROR (STD DEV)	0.03
37.70	MINIMUM	14.84
53.40	MAXIMUM	21.02
SKEWNESS		0.27
KURTOSIS		3.23
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
47.83	MEAN	18.83
0.07	STD ERROR (MEAN)	0.03
2.60	STANDARD DEVIATION	1.02
0.05	STD ERROR (STD DEV)	0.02
39.80	MINIMUM	15.67
56.10	MAXIMUM	22.09
SKEWNESS		0.21
KURTOSIS		2.94
COEFFICIENT OF VARIATION		5.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	37.25	-	37.75					
0	0.00	1	0.16	37.75	-	38.25					
1	0.16	2	0.32	38.25	-	38.75					
5	0.81	7	1.13	38.75	-	39.25					
4	0.65	11	1.77	39.25	-	39.75					
14	2.26	25	4.03	39.75	-	40.25		2	0.15	2	0.15
13	2.10	38	6.13	40.25	-	40.75		1	0.08	3	0.23
19	3.06	57	9.19	40.75	-	41.25		1	0.08	4	0.31
30	4.84	87	14.03	41.25	-	41.75		3	0.23	7	0.54
40	6.45	127	20.48	41.75	-	42.25		6	0.46	13	1.00
43	6.94	170	27.42	42.25	-	42.75		7	0.54	20	1.54
51	8.23	221	35.65	42.75	-	43.25		16	1.23	36	2.77
41	6.61	262	42.26	43.25	-	43.75		24	1.84	60	4.61
46	7.42	308	49.68	43.75	-	44.25		36	2.77	96	7.38
56	9.03	364	58.71	44.25	-	44.75		51	3.92	147	11.30
49	7.90	413	66.61	44.75	-	45.25		69	5.30	216	16.60
56	9.03	469	75.65	45.25	-	45.75		70	5.38	286	21.98
39	6.29	508	81.94	45.75	-	46.25		76	5.84	362	27.82
19	3.06	527	85.00	46.25	-	46.75		99	7.61	461	35.43
28	4.52	555	89.52	46.75	-	47.25		100	7.69	561	43.12
25	4.03	580	93.55	47.25	-	47.75		81	6.23	642	49.35
14	2.26	594	95.81	47.75	-	48.25		117	8.99	759	58.34
8	1.29	602	97.10	48.25	-	48.75		92	7.07	851	65.41
4	0.65	606	97.74	48.75	-	49.25		87	6.69	938	72.10
6	0.97	612	98.71	49.25	-	49.75		55	4.23	993	76.33
3	0.48	615	99.19	49.75	-	50.25		74	5.69	1067	82.01
1	0.16	616	99.35	50.25	-	50.75		49	3.77	1116	85.78
1	0.16	617	99.52	50.75	-	51.25		56	4.30	1172	90.08
1	0.16	618	99.68	51.25	-	51.75		35	2.69	1207	92.77
1	0.16	619	99.84	51.75	-	52.25		26	2.00	1233	94.77
0	0.00	619	99.84	52.25	-	52.75		19	1.46	1252	96.23
0	0.00	619	99.84	52.75	-	53.25		16	1.23	1268	97.46
1	0.16	620	100.00	53.25	-	53.75		14	1.08	1282	98.54
				53.75	-	54.25		7	0.54	1289	99.08
				54.25	-	54.75		5	0.38	1294	99.46
				54.75	-	55.25		4	0.31	1298	99.77
				55.25	-	55.75		0	0.00	1298	99.77
				55.75	-	56.25		3	0.23	1301	100.00

(83) TRAGION - TOP OF HEAD

The vertical distance between the right tragion landmark and the horizontal plane tangent to the top of the head is measured with a beam caliper with a paddle blade. The participant sits with the head in the Frankfurt plane.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
11.12	4.38	1ST	11.70	4.61
11.30	4.45	2ND	11.80	4.65
11.30	4.45	3RD	12.00	4.72
11.40	4.49	5TH	12.10	4.76
11.70	4.61	10TH	12.30	4.84
11.90	4.69	15TH	12.50	4.92
12.00	4.72	20TH	12.60	4.96
12.10	4.76	25TH	12.70	5.00
12.20	4.80	30TH	12.80	5.04
12.30	4.84	35TH	12.90	5.08
12.30	4.84	40TH	13.00	5.12
12.40	4.88	45TH	13.10	5.16
12.50	4.92	50TH	13.20	5.20
12.50	4.92	55TH	13.30	5.24
12.60	4.96	60TH	13.30	5.24
12.70	5.00	65TH	13.40	5.28
12.70	5.00	70TH	13.50	5.31
12.90	5.08	75TH	13.60	5.35
13.00	5.12	80TH	13.70	5.39
13.10	5.16	85TH	13.80	5.43
13.20	5.20	90TH	14.00	5.51
13.40	5.28	95TH	14.20	5.59
13.50	5.31	97TH	14.39	5.67
13.60	5.35	98TH	14.40	5.67
13.80	5.43	99TH	14.60	5.75

(83) TRAGION-TOP OF HEAD

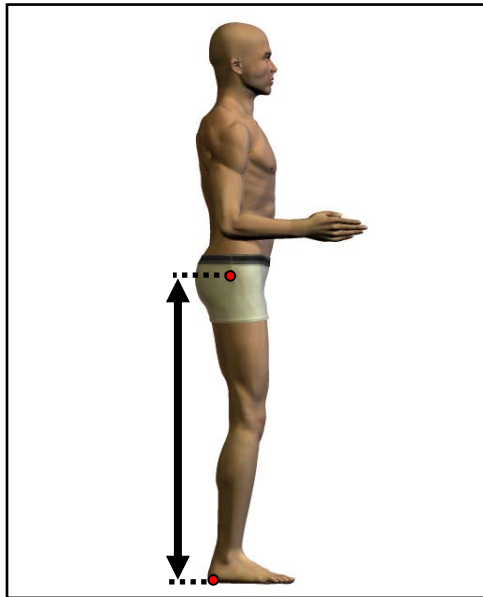
FEMALES		
CM		IN
12.46	MEAN	4.91
0.02	STD ERROR (MEAN)	0.01
0.58	STANDARD DEVIATION	0.23
0.02	STD ERROR (STD DEV)	0.01
10.60	MINIMUM	4.17
14.10	MAXIMUM	5.55
SKEWNESS		-0.07
KURTOSIS		2.94
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
13.15	MEAN	5.18
0.02	STD ERROR (MEAN)	0.01
0.64	STANDARD DEVIATION	0.25
0.01	STD ERROR (STD DEV)	0.00
11.30	MINIMUM	4.45
15.30	MAXIMUM	6.02
SKEWNESS		0.00
KURTOSIS		2.82
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		1301

FREQUENCIES											
FEMALES						MALES					
E	FPct	CumF	CumFPct	CM		E	FPct	CumF	CumFPct		
1	0.16	1	0.16	10.55	-	10.65					
1	0.16	2	0.32	10.65	-	10.75					
0	0.00	2	0.32	10.75	-	10.85					
1	0.16	3	0.48	10.85	-	10.95					
0	0.00	3	0.48	10.95	-	11.05					
3	0.48	6	0.97	11.05	-	11.15					
4	0.65	10	1.61	11.15	-	11.25					
13	2.10	23	3.71	11.25	-	11.35	2	0.15	2	0.15	
11	1.77	34	5.48	11.35	-	11.45	0	0.00	2	0.15	
9	1.45	43	6.94	11.45	-	11.55	4	0.31	6	0.46	
7	1.13	50	8.06	11.55	-	11.65	6	0.46	12	0.92	
21	3.39	71	11.45	11.65	-	11.75	10	0.77	22	1.69	
14	2.26	85	13.71	11.75	-	11.85	6	0.46	28	2.15	
23	3.71	108	17.42	11.85	-	11.95	10	0.77	38	2.92	
37	5.97	145	23.39	11.95	-	12.05	17	1.31	55	4.23	
37	5.97	182	29.35	12.05	-	12.15	23	1.77	78	6.00	
34	5.48	216	34.84	12.15	-	12.25	26	2.00	104	7.99	
47	7.58	263	42.42	12.25	-	12.35	42	3.23	146	11.22	
42	6.77	305	49.19	12.35	-	12.45	45	3.46	191	14.68	
45	7.26	350	56.45	12.45	-	12.55	55	4.23	246	18.91	
43	6.94	393	63.39	12.55	-	12.65	59	4.53	305	23.44	
42	6.77	435	70.16	12.65	-	12.75	49	3.77	354	27.21	
29	4.68	464	74.84	12.75	-	12.85	72	5.53	426	32.74	
22	3.55	486	78.39	12.85	-	12.95	58	4.46	484	37.20	
35	5.65	521	84.03	12.95	-	13.05	72	5.53	556	42.74	
22	3.55	543	87.58	13.05	-	13.15	76	5.84	632	48.58	
18	2.90	561	90.48	13.15	-	13.25	78	6.00	710	54.57	
24	3.87	585	94.35	13.25	-	13.35	93	7.15	803	61.72	
9	1.45	594	95.81	13.35	-	13.45	73	5.61	876	67.33	
13	2.10	607	97.90	13.45	-	13.55	86	6.61	962	73.94	
2	0.32	609	98.23	13.55	-	13.65	53	4.07	1015	78.02	
3	0.48	612	98.71	13.65	-	13.75	54	4.15	1069	82.17	
4	0.65	616	99.35	13.75	-	13.85	54	4.15	1123	86.32	
1	0.16	617	99.52	13.85	-	13.95	34	2.61	1157	88.93	
1	0.16	618	99.68	13.95	-	14.05	42	3.23	1199	92.16	
2	0.32	620	100.00	14.05	-	14.15	21	1.61	1220	93.77	
				14.15	-	14.25	19	1.46	1239	95.23	
				14.25	-	14.35	23	1.77	1262	97.00	
				14.35	-	14.45	14	1.08	1276	98.08	
				14.45	-	14.55	11	0.85	1287	98.92	
				14.55	-	14.65	3	0.23	1290	99.15	
				14.65	-	14.75	4	0.31	1294	99.46	
				14.75	-	14.85	3	0.23	1297	99.69	
				14.85	-	14.95	1	0.08	1298	99.77	
				14.95	-	15.05	0	0.00	1298	99.77	
				15.05	-	15.15	1	0.08	1299	99.85	
				15.15	-	15.25	1	0.08	1300	99.92	
				15.25	-	15.35	1	0.08	1301	100.00	

(84) TROCHANTERION HEIGHT

The vertical distance between a standing surface and the trochanterion landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
76.30	30.04	1ST	81.40	32.05
76.84	30.26	2ND	82.20	32.36
77.46	30.50	3RD	82.71	32.56
78.40	30.87	5TH	83.70	32.95
79.70	31.38	10TH	85.50	33.66
80.60	31.73	15TH	86.60	34.09
81.60	32.13	20TH	87.40	34.41
82.03	32.29	25TH	88.10	34.69
82.73	32.57	30TH	88.70	34.92
83.50	32.87	35TH	89.30	35.16
83.90	33.03	40TH	90.00	35.43
84.40	33.23	45TH	90.60	35.67
85.00	33.46	50TH	91.20	35.91
85.50	33.66	55TH	91.80	36.14
86.20	33.94	60TH	92.32	36.35
86.80	34.17	65TH	93.10	36.65
87.40	34.41	70TH	93.80	36.93
87.98	34.64	75TH	94.60	37.24
88.50	34.84	80TH	95.60	37.64
89.29	35.15	85TH	96.80	38.11
90.39	35.59	90TH	97.80	38.50
92.00	36.22	95TH	99.70	39.25
93.21	36.69	97TH	100.99	39.76
94.26	37.11	98TH	102.48	40.34
96.17	37.86	99TH	103.60	40.79

(84) TROCHANTERION HEIGHT

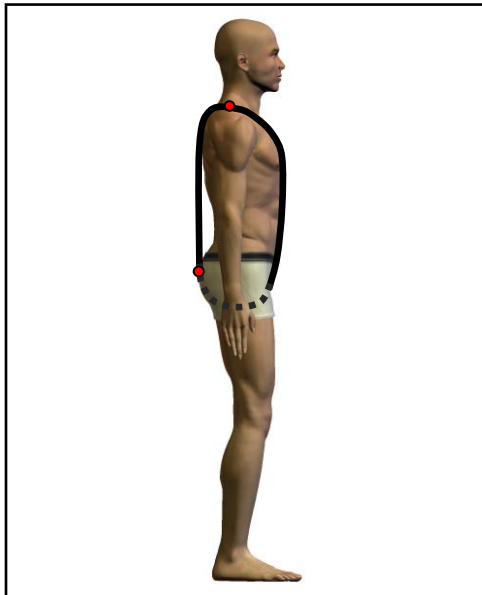
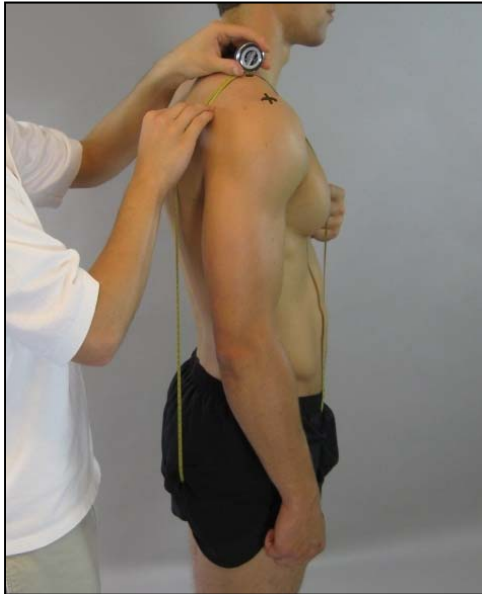
FEMALES		
CM		IN
85.08	MEAN	33.50
0.17	STD ERROR (MEAN)	0.07
4.18	STANDARD DEVIATION	1.65
0.12	STD ERROR (STD DEV)	0.05
74.40	MINIMUM	29.29
99.50	MAXIMUM	39.17
SKEWNESS		0.20
KURTOSIS		3.02
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
91.45	MEAN	36.01
0.13	STD ERROR (MEAN)	0.05
4.80	STANDARD DEVIATION	1.89
0.09	STD ERROR (STD DEV)	0.04
77.60	MINIMUM	30.55
106.80	MAXIMUM	42.05
SKEWNESS		0.23
KURTOSIS		2.92
COEFFICIENT OF VARIATION		5.2%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
2	0.32	2	0.32	73.55	-	74.55					
1	0.16	3	0.48	74.55	-	75.55					
5	0.81	8	1.29	75.55	-	76.55					
11	1.77	19	3.06	76.55	-	77.55					
14	2.26	33	5.32	77.55	-	78.55					
23	3.71	56	9.03	78.55	-	79.55		1	0.08	1	0.08
35	5.65	91	14.68	79.55	-	80.55		4	0.31	5	0.38
32	5.16	123	19.84	80.55	-	81.55		2	0.15	7	0.54
55	8.87	178	28.71	81.55	-	82.55		9	0.69	16	1.23
47	7.58	225	36.29	82.55	-	83.55		18	1.38	34	2.61
69	11.13	294	47.42	83.55	-	84.55		29	2.23	63	4.84
49	7.90	343	55.32	84.55	-	85.55		28	2.15	91	6.99
49	7.90	392	63.23	85.55	-	86.55		41	3.15	132	10.15
50	8.06	442	71.29	86.55	-	87.55		62	4.77	194	14.91
56	9.03	498	80.32	87.55	-	88.55		84	6.46	278	21.37
42	6.77	540	87.10	88.55	-	89.55		86	6.61	364	27.98
23	3.71	563	90.81	89.55	-	90.55		108	8.30	472	36.28
21	3.39	584	94.19	90.55	-	91.55		103	7.92	575	44.20
12	1.94	596	96.13	91.55	-	92.55		113	8.69	688	52.88
7	1.13	603	97.26	92.55	-	93.55		106	8.15	794	61.03
7	1.13	610	98.39	93.55	-	94.55		94	7.23	888	68.26
3	0.48	613	98.87	94.55	-	95.55		85	6.53	973	74.79
3	0.48	616	99.35	95.55	-	96.55		67	5.15	1040	79.94
2	0.32	618	99.68	96.55	-	97.55		55	4.23	1095	84.17
1	0.16	619	99.84	97.55	-	98.55		65	5.00	1160	89.16
1	0.16	620	100.00	98.55	-	99.55		42	3.23	1202	92.39
				99.55	-	100.55		31	2.38	1233	94.77
				100.55	-	101.55		24	1.84	1257	96.62
				101.55	-	102.55		14	1.08	1271	97.69
				102.55	-	103.55		5	0.38	1276	98.08
				103.55	-	104.55		12	0.92	1288	99.00
				104.55	-	105.55		7	0.54	1295	99.54
				105.55	-	106.55		3	0.23	1298	99.77
				106.55	-	107.55		1	0.08	1299	99.85
								2	0.15	1301	100.00

(85) VERTICAL TRUNK CIRCUMFERENCE (USA)

The vertical circumference of the torso is measured with a tape passing over the buttock point, posterior landmark, to the right of the genitalia, midway between the sternum and the anterior axillary fold and across the midshoulder landmark. The participant stands erect looking straight ahead with the right arm hanging relaxed at the side. The heels are together with the weight distributed equally on both feet. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
139.13	54.77	1ST	149.50	58.86
140.64	55.37	2ND	150.20	59.13
141.10	55.55	3RD	151.20	59.53
142.71	56.18	5TH	152.61	60.08
145.10	57.13	10TH	155.90	61.38
146.70	57.76	15TH	157.53	62.02
147.90	58.23	20TH	158.94	62.58
148.80	58.58	25TH	160.15	63.05
149.90	59.02	30TH	161.40	63.54
150.84	59.38	35TH	162.47	63.97
151.60	59.69	40TH	163.40	64.33
152.40	60.00	45TH	164.50	64.76
153.20	60.31	50TH	165.60	65.20
153.96	60.61	55TH	166.40	65.51
154.80	60.94	60TH	167.60	65.98
155.67	61.29	65TH	168.70	66.42
156.20	61.50	70TH	169.70	66.81
157.35	61.95	75TH	170.80	67.24
158.40	62.36	80TH	172.36	67.85
160.09	63.02	85TH	174.04	68.52
161.49	63.58	90TH	176.10	69.33
165.20	65.04	95TH	178.99	70.47
167.15	65.81	97TH	181.00	71.26
169.22	66.62	98TH	182.59	71.89
172.23	67.80	99TH	185.30	72.95

(85) VERTICAL TRUNK CIRCUMFERENCE (USA)

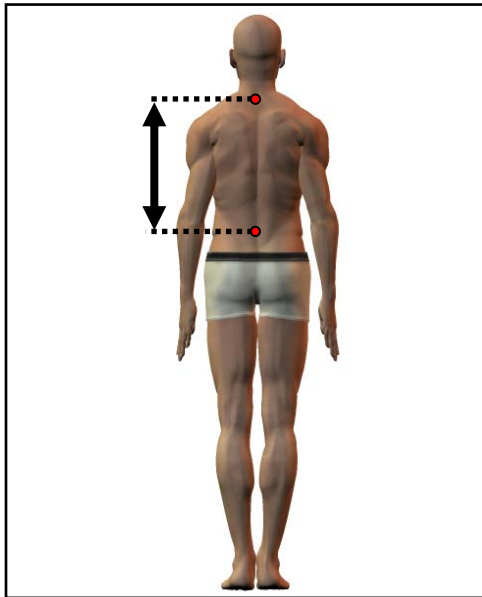
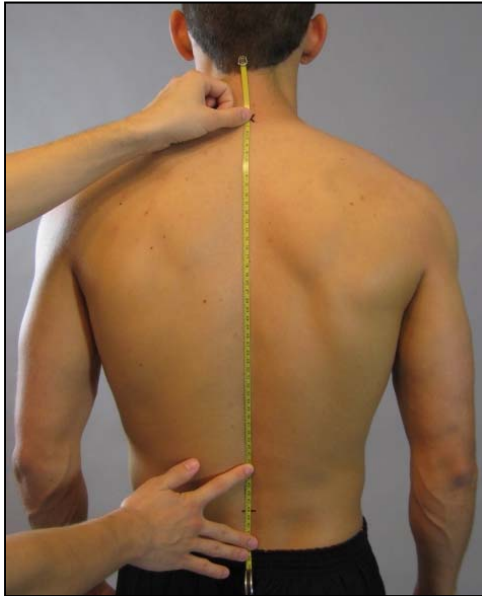
FEMALES		
<u>CM</u>		<u>IN</u>
153.38	MEAN	60.39
0.27	STD ERROR (MEAN)	0.11
6.77	STANDARD DEVIATION	2.67
0.19	STD ERROR (STD DEV)	0.08
132.40	MINIMUM	52.13
179.90	MAXIMUM	70.83
SKEWNESS		0.41
KURTOSIS		3.91
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
165.74	MEAN	65.25
0.22	STD ERROR (MEAN)	0.09
7.91	STANDARD DEVIATION	3.11
0.16	STD ERROR (STD DEV)	0.06
140.00	MINIMUM	55.12
194.90	MAXIMUM	76.73
SKEWNESS		0.19
KURTOSIS		2.95
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		1301

FEMALES					FREQUENCIES		MALES			
F	FPct	CumF	CumFPct		CM		F	FPct	CumF	CumFPct
2	0.32	2	0.32	132.25	-	133.75				
0	0.00	2	0.32	133.75	-	135.25				
1	0.16	3	0.48	135.25	-	136.75				
1	0.16	4	0.65	136.75	-	138.25				
4	0.65	8	1.29	138.25	-	139.75				
11	1.77	19	3.06	139.75	-	141.25	1	0.08	1	0.08
12	1.94	31	5.00	141.25	-	142.75	0	0.00	1	0.08
18	2.90	49	7.90	142.75	-	144.25	0	0.00	1	0.08
24	3.87	73	11.77	144.25	-	145.75	0	0.00	1	0.08
32	5.16	105	16.94	145.75	-	147.25	1	0.08	2	0.15
49	7.90	154	24.84	147.25	-	148.75	7	0.54	9	0.69
45	7.26	199	32.10	148.75	-	150.25	17	1.31	26	2.00
57	9.19	256	41.29	150.25	-	151.75	20	1.54	46	3.54
56	9.03	312	50.32	151.75	-	153.25	31	2.38	77	5.92
58	9.35	370	59.68	153.25	-	154.75	24	1.84	101	7.76
68	10.97	438	70.65	154.75	-	156.25	39	3.00	140	10.76
43	6.94	481	77.58	156.25	-	157.75	66	5.07	206	15.83
35	5.65	516	83.23	157.75	-	159.25	68	5.23	274	21.06
28	4.52	544	87.74	159.25	-	160.75	83	6.38	357	27.44
23	3.71	567	91.45	160.75	-	162.25	89	6.84	446	34.28
8	1.29	575	92.74	162.25	-	163.75	96	7.38	542	41.66
15	2.42	590	95.16	163.75	-	165.25	88	6.76	630	48.42
11	1.77	601	96.94	165.25	-	166.75	100	7.69	730	56.11
2	0.32	603	97.26	166.75	-	168.25	84	6.46	814	62.57
6	0.97	609	98.23	168.25	-	169.75	104	7.99	918	70.56
4	0.65	613	98.87	169.75	-	171.25	79	6.07	997	76.63
2	0.32	615	99.19	171.25	-	172.75	57	4.38	1054	81.01
0	0.00	615	99.19	172.75	-	174.25	58	4.46	1112	85.47
2	0.32	617	99.52	174.25	-	175.75	51	3.92	1163	89.39
1	0.16	618	99.68	175.75	-	177.25	33	2.54	1196	91.93
0	0.00	618	99.68	177.25	-	178.75	35	2.69	1231	94.62
2	0.32	620	100.00	178.75	-	180.25	23	1.77	1254	96.39
				180.25	-	181.75	15	1.15	1269	97.54
				181.75	-	183.25	9	0.69	1278	98.23
				183.25	-	184.75	8	0.61	1286	98.85
				184.75	-	186.25	6	0.46	1292	99.31
				186.25	-	187.75	4	0.31	1296	99.62
				187.75	-	189.25	1	0.08	1297	99.69
				189.25	-	190.75	2	0.15	1299	99.85
				190.75	-	192.25	1	0.08	1300	99.92
				192.25	-	193.75	0	0.00	1300	99.92
				193.75	-	195.25	1	0.08	1301	100.00

(86) WAIST BACK LENGTH (OMPHALION)*

The surface distance between the cervicale landmark and the posterior omphalion landmark is measured with a tape. The participant stands erect with the head in the Frankfurt plane. The shoulders and upper extremities are relaxed. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
37.00	14.57	1ST	40.20	15.83
37.38	14.72	2ND	40.90	16.10
37.66	14.83	3RD	41.40	16.30
38.20	15.04	5TH	42.00	16.54
39.20	15.43	10TH	42.90	16.89
39.62	15.60	15TH	43.50	17.13
40.20	15.83	20TH	44.10	17.36
40.70	16.02	25TH	44.50	17.52
41.10	16.18	30TH	44.90	17.68
41.40	16.30	35TH	45.27	17.82
41.70	16.42	40TH	45.60	17.95
42.00	16.54	45TH	46.00	18.11
42.40	16.69	50TH	46.20	18.19
42.66	16.79	55TH	46.60	18.35
43.00	16.93	60TH	47.00	18.50
43.27	17.04	65TH	47.40	18.66
43.60	17.17	70TH	47.70	18.78
43.98	17.31	75TH	48.20	18.98
44.40	17.48	80TH	48.70	19.17
45.10	17.76	85TH	49.17	19.36
45.79	18.03	90TH	49.80	19.61
46.90	18.46	95TH	50.70	19.96
47.44	18.67	97TH	51.50	20.28
47.66	18.76	98TH	52.10	20.51
49.07	19.32	99TH	52.99	20.87

*In ANSUR cervicale was defined as the highest point on the seventh cervical vertebra. For consistency with international standards, it is now the most prominent point on the seventh cervical vertebra.

(86) WAIST BACK LENGTH (OMPHALION)

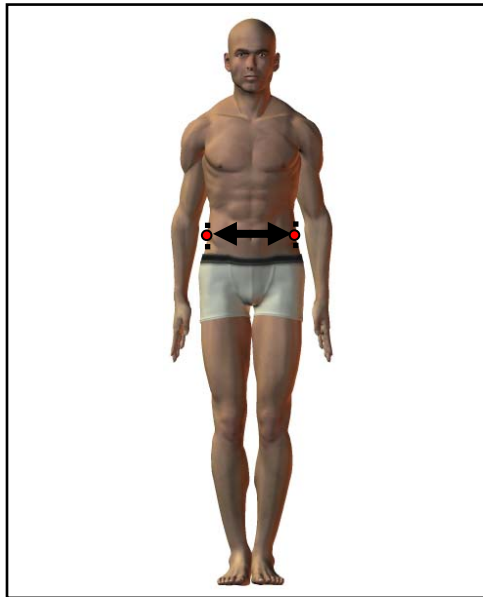
FEMALES		
CM		IN
42.39	MEAN	16.69
0.10	STD ERROR (MEAN)	0.04
2.56	STANDARD DEVIATION	1.01
0.07	STD ERROR (STD DEV)	0.03
34.70	MINIMUM	13.66
51.40	MAXIMUM	20.24
SKEWNESS		0.22
KURTOSIS		3.12
COEFFICIENT OF VARIATION		6.0%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
46.35	MEAN	18.25
0.08	STD ERROR (MEAN)	0.03
2.71	STANDARD DEVIATION	1.07
0.05	STD ERROR (STD DEV)	0.02
38.00	MINIMUM	14.96
57.20	MAXIMUM	22.52
SKEWNESS		0.15
KURTOSIS		3.16
COEFFICIENT OF VARIATION		5.8%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	34.25	-	34.75					
0	0.00	1	0.16	34.75	-	35.25					
0	0.00	1	0.16	35.25	-	35.75					
2	0.32	3	0.48	35.75	-	36.25					
1	0.16	4	0.65	36.25	-	36.75					
6	0.97	10	1.61	36.75	-	37.25					
9	1.45	19	3.06	37.25	-	37.75					
13	2.10	32	5.16	37.75	-	38.25		1	0.08	1	0.08
10	1.61	42	6.77	38.25	-	38.75		2	0.15	3	0.23
23	3.71	65	10.48	38.75	-	39.25		0	0.00	3	0.23
34	5.48	99	15.97	39.25	-	39.75		3	0.23	6	0.46
28	4.52	127	20.48	39.75	-	40.25		7	0.54	13	1.00
33	5.32	160	25.81	40.25	-	40.75		7	0.54	20	1.54
48	7.74	208	33.55	40.75	-	41.25		15	1.15	35	2.69
47	7.58	255	41.13	41.25	-	41.75		21	1.61	56	4.30
47	7.58	302	48.71	41.75	-	42.25		24	1.84	80	6.15
53	8.55	355	57.26	42.25	-	42.75		37	2.84	117	8.99
48	7.74	403	65.00	42.75	-	43.25		47	3.61	164	12.61
50	8.06	453	73.06	43.25	-	43.75		52	4.00	216	16.60
33	5.32	486	78.39	43.75	-	44.25		66	5.07	282	21.68
22	3.55	508	81.94	44.25	-	44.75		79	6.07	361	27.75
27	4.35	535	86.29	44.75	-	45.25		94	7.23	455	34.97
23	3.71	558	90.00	45.25	-	45.75		96	7.38	551	42.35
15	2.42	573	92.42	45.75	-	46.25		106	8.15	657	50.50
9	1.45	582	93.87	46.25	-	46.75		83	6.38	740	56.88
17	2.74	599	96.61	46.75	-	47.25		93	7.15	833	64.03
11	1.77	610	98.39	47.25	-	47.75		80	6.15	913	70.18
2	0.32	612	98.71	47.75	-	48.25		74	5.69	987	75.86
2	0.32	614	99.03	48.25	-	48.75		70	5.38	1057	81.25
1	0.16	615	99.19	48.75	-	49.25		57	4.38	1114	85.63
1	0.16	616	99.35	49.25	-	49.75		51	3.92	1165	89.55
2	0.32	618	99.68	49.75	-	50.25		46	3.54	1211	93.08
1	0.16	619	99.84	50.25	-	50.75		29	2.23	1240	95.31
0	0.00	619	99.84	50.75	-	51.25		15	1.15	1255	96.46
1	0.16	620	100.00	51.25	-	51.75		13	1.00	1268	97.46
				51.75	-	52.25		13	1.00	1281	98.46
				52.25	-	52.75		7	0.54	1288	99.00
				52.75	-	53.25		2	0.15	1290	99.15
				53.25	-	53.75		2	0.15	1292	99.31
				53.75	-	54.25		4	0.31	1296	99.62
				54.25	-	54.75		1	0.08	1297	99.69
				54.75	-	55.25		2	0.15	1299	99.85
				55.25	-	55.75		0	0.00	1299	99.85
				55.75	-	56.25		1	0.08	1300	99.92
				56.25	-	56.75		0	0.00	1300	99.92
				56.75	-	57.25		1	0.08	1301	100.00

(87) WAIST BREADTH

The horizontal breadth of the waist at the level of omphalion is measured with a beam caliper. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
23.32	9.18	1ST	25.20	9.92
23.90	9.41	2ND	26.00	10.24
24.40	9.61	3RD	26.20	10.31
24.80	9.76	5TH	26.60	10.47
25.50	10.04	10TH	27.40	10.79
26.00	10.24	15TH	28.00	11.02
26.40	10.39	20TH	28.50	11.22
26.90	10.59	25TH	29.00	11.42
27.30	10.75	30TH	29.30	11.54
27.80	10.94	35TH	29.80	11.73
28.10	11.06	40TH	30.10	11.85
28.60	11.26	45TH	30.60	12.05
28.80	11.34	50TH	31.00	12.20
29.20	11.50	55TH	31.50	12.40
29.50	11.61	60TH	31.80	12.52
29.80	11.73	65TH	32.30	12.72
30.20	11.89	70TH	32.70	12.87
30.60	12.05	75TH	33.10	13.03
31.10	12.24	80TH	33.70	13.27
31.70	12.48	85TH	34.40	13.54
32.30	12.72	90TH	35.10	13.82
33.50	13.19	95TH	36.20	14.25
33.98	13.38	97TH	37.20	14.65
35.06	13.80	98TH	37.40	14.72
36.70	14.45	99TH	38.80	15.28

(87) WAIST BREADTH

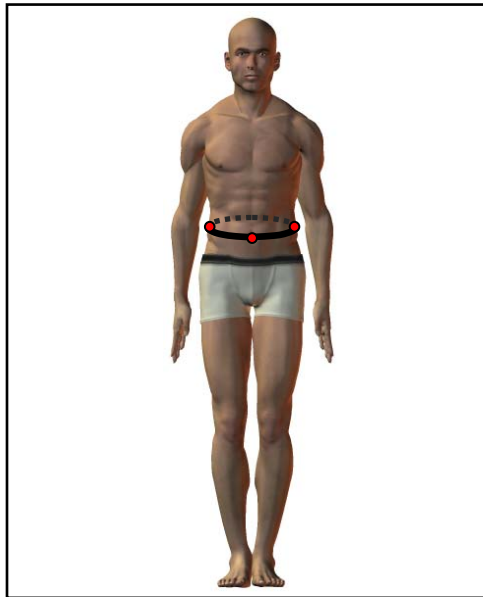
FEMALES		
CM		IN
28.90	MEAN	11.38
0.11	STD ERROR (MEAN)	0.04
2.72	STANDARD DEVIATION	1.07
0.08	STD ERROR (STD DEV)	0.03
20.90	MINIMUM	8.23
39.50	MAXIMUM	15.55
SKEWNESS		0.37
KURTOSIS		3.46
COEFFICIENT OF VARIATION		9.4%
NUMBER OF PARTICIPANTS		619

MALES		
CM		IN
31.15	MEAN	12.26
0.08	STD ERROR (MEAN)	0.03
2.97	STANDARD DEVIATION	1.17
0.06	STD ERROR (STD DEV)	0.02
24.00	MINIMUM	9.45
42.30	MAXIMUM	16.65
SKEWNESS		0.34
KURTOSIS		2.95
COEFFICIENT OF VARIATION		9.5%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	20.75	-	21.25					
1	0.16	2	0.32	21.25	-	21.75					
0	0.00	2	0.32	21.75	-	22.25					
1	0.16	3	0.48	22.25	-	22.75					
2	0.32	5	0.81	22.75	-	23.25					
5	0.81	10	1.62	23.25	-	23.75					
6	0.97	16	2.58	23.75	-	24.25		4	0.31	4	0.31
14	2.26	30	4.85	24.25	-	24.75		4	0.31	8	0.61
17	2.75	47	7.59	24.75	-	25.25		5	0.38	13	1.00
28	4.52	75	12.12	25.25	-	25.75		7	0.54	20	1.54
33	5.33	108	17.45	25.75	-	26.25		23	1.77	43	3.31
31	5.01	139	22.46	26.25	-	26.75		31	2.38	74	5.69
39	6.30	178	28.76	26.75	-	27.25		43	3.31	117	8.99
34	5.49	212	34.25	27.25	-	27.75		51	3.92	168	12.91
44	7.11	256	41.36	27.75	-	28.25		52	4.00	220	16.91
41	6.62	297	47.98	28.25	-	28.75		73	5.61	293	22.52
49	7.92	346	55.90	28.75	-	29.25		87	6.69	380	29.21
54	8.72	400	64.62	29.25	-	29.75		74	5.69	454	34.90
34	5.49	434	70.11	29.75	-	30.25		88	6.76	542	41.66
42	6.79	476	76.90	30.25	-	30.75		75	5.76	617	47.43
29	4.68	505	81.58	30.75	-	31.25		77	5.92	694	53.34
22	3.55	527	85.14	31.25	-	31.75		72	5.53	766	58.88
25	4.04	552	89.18	31.75	-	32.25		78	6.00	844	64.87
18	2.91	570	92.08	32.25	-	32.75		83	6.38	927	71.25
12	1.94	582	94.02	32.75	-	33.25		68	5.23	995	76.48
14	2.26	596	96.28	33.25	-	33.75		50	3.84	1045	80.32
8	1.29	604	97.58	33.75	-	34.25		46	3.54	1091	83.86
2	0.32	606	97.90	34.25	-	34.75		59	4.53	1150	88.39
3	0.48	609	98.38	34.75	-	35.25		31	2.38	1181	90.78
1	0.16	610	98.55	35.25	-	35.75		35	2.69	1216	93.47
2	0.32	612	98.87	35.75	-	36.25		23	1.77	1239	95.23
2	0.32	614	99.19	36.25	-	36.75		14	1.08	1253	96.31
2	0.32	616	99.52	36.75	-	37.25		15	1.15	1268	97.46
1	0.16	617	99.68	37.25	-	37.75		13	1.00	1281	98.46
0	0.00	617	99.68	37.75	-	38.25		4	0.31	1285	98.77
0	0.00	617	99.68	38.25	-	38.75		3	0.23	1288	99.00
1	0.16	618	99.84	38.75	-	39.25		5	0.38	1293	99.39
1	0.16	619	100.00	39.25	-	39.75		2	0.15	1295	99.54
				39.75	-	40.25		1	0.08	1296	99.62
				40.25	-	40.75		0	0.00	1296	99.62
				40.75	-	41.25		3	0.23	1299	99.85
				41.25	-	41.75		0	0.00	1299	99.85
				41.75	-	42.25		1	0.08	1300	99.92
				42.25	-	42.75		1	0.08	1301	100.00

(88) WAIST CIRCUMFERENCE (OMPHALION)

The horizontal circumference of the waist, passing over all omphalion landmarks, is measured with a tape. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The measurement is made at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
66.27	26.09	1ST	71.20	28.03
68.74	27.07	2ND	72.80	28.66
69.13	27.21	3RD	73.90	29.09
71.11	27.99	5TH	75.20	29.61
72.90	28.70	10TH	77.12	30.36
74.42	29.30	15TH	78.80	31.02
75.30	29.65	20TH	80.30	31.61
76.90	30.28	25TH	81.60	32.13
78.00	30.71	30TH	83.10	32.72
79.20	31.18	35TH	84.30	33.19
80.30	31.61	40TH	85.60	33.70
81.30	32.01	45TH	86.60	34.09
82.00	32.28	50TH	87.80	34.57
83.36	32.82	55TH	89.10	35.08
84.20	33.15	60TH	90.40	35.59
85.00	33.46	65TH	91.43	35.99
86.30	33.98	70TH	92.90	36.57
87.28	34.36	75TH	94.50	37.20
88.70	34.92	80TH	96.46	37.97
90.49	35.62	85TH	98.17	38.65
93.19	36.69	90TH	100.10	39.41
96.89	38.14	95TH	103.70	40.83
98.67	38.85	97TH	105.80	41.65
102.29	40.27	98TH	107.47	42.31
106.60	41.97	99TH	109.80	43.23

(88) WAIST CIRCUMFERENCE (OMPHALION)

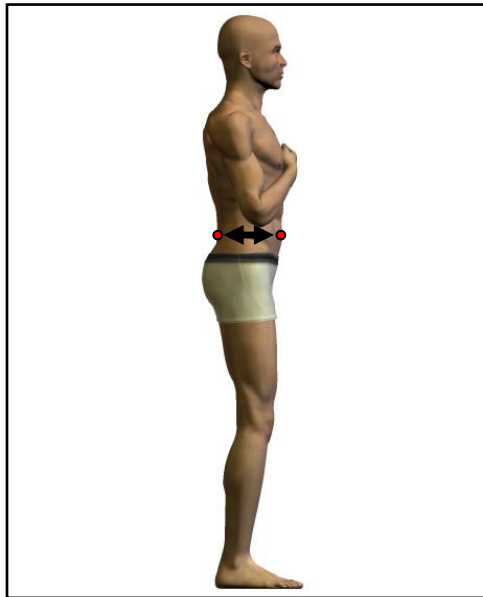
FEMALES		
CM		IN
82.64	MEAN	32.53
0.32	STD ERROR (MEAN)	0.13
8.05	STANDARD DEVIATION	3.17
0.23	STD ERROR (STD DEV)	0.09
64.60	MINIMUM	25.43
118.50	MAXIMUM	46.65
SKEWNESS		0.59
KURTOSIS		3.80
COEFFICIENT OF VARIATION		9.7%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
88.40	MEAN	34.80
0.25	STD ERROR (MEAN)	0.10
8.90	STANDARD DEVIATION	3.50
0.17	STD ERROR (STD DEV)	0.07
67.80	MINIMUM	26.69
125.50	MAXIMUM	49.41
SKEWNESS		0.37
KURTOSIS		2.93
COEFFICIENT OF VARIATION		10.1%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
3	0.48	3	0.48	63.75	-	65.25					
3	0.48	6	0.97	65.25	-	66.75					
2	0.32	8	1.29	66.75	-	68.25		1	0.08	1	0.08
13	2.10	21	3.39	68.25	-	69.75		4	0.31	5	0.38
11	1.77	32	5.16	69.75	-	71.25		8	0.61	13	1.00
28	4.52	60	9.68	71.25	-	72.75		12	0.92	25	1.92
27	4.35	87	14.03	72.75	-	74.25		20	1.54	45	3.46
49	7.90	136	21.94	74.25	-	75.75		38	2.92	83	6.38
30	4.84	166	26.77	75.75	-	77.25		52	4.00	135	10.38
40	6.45	206	33.23	77.25	-	78.75		59	4.53	194	14.91
40	6.45	246	39.68	78.75	-	80.25		65	5.00	259	19.91
55	8.87	301	48.55	80.25	-	81.75		74	5.69	333	25.60
39	6.29	340	54.84	81.75	-	83.25		65	5.00	398	30.59
51	8.23	391	63.06	83.25	-	84.75		84	6.46	482	37.05
41	6.61	432	69.68	84.75	-	86.25		79	6.07	561	43.12
41	6.61	473	76.29	86.25	-	87.75		89	6.84	650	49.96
35	5.65	508	81.94	87.75	-	89.25		75	5.76	725	55.73
22	3.55	530	85.48	89.25	-	90.75		71	5.46	796	61.18
15	2.42	545	87.90	90.75	-	92.25		86	6.61	882	67.79
17	2.74	562	90.65	92.25	-	93.75		64	4.92	946	72.71
18	2.90	580	93.55	93.75	-	95.25		58	4.46	1004	77.17
9	1.45	589	95.00	95.25	-	96.75		48	3.69	1052	80.86
9	1.45	598	96.45	96.75	-	98.25		58	4.46	1110	85.32
8	1.29	606	97.74	98.25	-	99.75		54	4.15	1164	89.47
1	0.16	607	97.90	99.75	-	101.25		35	2.69	1199	92.16
1	0.16	608	98.06	101.25	-	102.75		21	1.61	1220	93.77
3	0.48	611	98.55	102.75	-	104.25		26	2.00	1246	95.77
2	0.32	613	98.87	104.25	-	105.75		15	1.15	1261	96.93
2	0.32	615	99.19	105.75	-	107.25		14	1.08	1275	98.00
1	0.16	616	99.35	107.25	-	108.75		10	0.77	1285	98.77
2	0.32	618	99.68	108.75	-	110.25		5	0.38	1290	99.15
1	0.16	619	99.84	110.25	-	111.75		2	0.15	1292	99.31
0	0.00	619	99.84	111.75	-	113.25		1	0.08	1293	99.39
0	0.00	619	99.84	113.25	-	114.75		3	0.23	1296	99.62
0	0.00	619	99.84	114.75	-	116.25		1	0.08	1297	99.69
0	0.00	619	99.84	116.25	-	117.75		0	0.00	1297	99.69
1	0.16	620	100.00	117.75	-	119.25		2	0.15	1299	99.85
				119.25	-	120.75		0	0.00	1299	99.85
				120.75	-	122.25		1	0.08	1300	99.92
				122.25	-	123.75		0	0.00	1300	99.92
				123.75	-	125.25		0	0.00	1300	99.92
				125.25	-	126.75		1	0.08	1301	100.00

(89) WAIST DEPTH

The horizontal distance between the anterior and posterior omphalion landmarks is measured with a beam caliper. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
15.60	6.14	1ST	17.20	6.77
15.90	6.26	2ND	17.60	6.93
16.10	6.34	3RD	17.80	7.01
16.31	6.42	5TH	18.20	7.17
17.00	6.69	10TH	18.90	7.44
17.50	6.89	15TH	19.33	7.61
17.80	7.01	20TH	19.70	7.76
18.00	7.09	25TH	20.00	7.87
18.30	7.20	30TH	20.40	8.03
18.70	7.36	35TH	20.70	8.15
18.90	7.44	40TH	21.00	8.27
19.20	7.56	45TH	21.40	8.43
19.60	7.72	50TH	21.70	8.54
19.80	7.80	55TH	22.00	8.66
20.00	7.87	60TH	22.30	8.78
20.37	8.02	65TH	22.70	8.94
20.60	8.11	70TH	23.10	9.09
21.20	8.35	75TH	23.50	9.25
21.70	8.54	80TH	24.10	9.49
22.19	8.73	85TH	24.60	9.69
23.18	9.12	90TH	25.20	9.92
24.59	9.69	95TH	26.39	10.39
25.54	10.05	97TH	27.20	10.71
26.26	10.33	98TH	27.70	10.91
27.20	10.71	99TH	28.79	11.34

(89) WAIST DEPTH

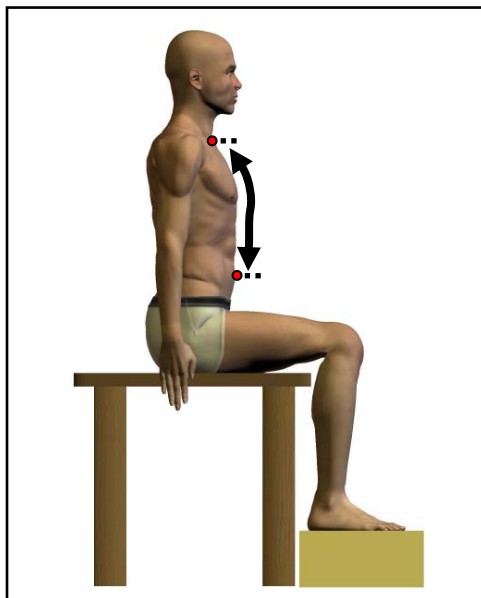
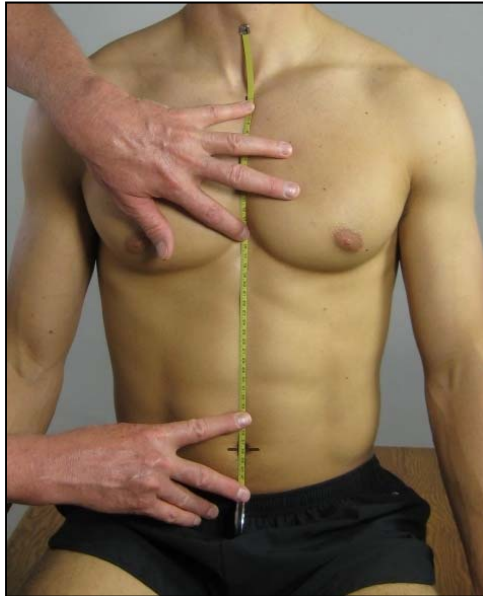
FEMALES		
CM		IN
19.81	MEAN	7.80
0.10	STD ERROR (MEAN)	0.04
2.48	STANDARD DEVIATION	0.98
0.07	STD ERROR (STD DEV)	0.03
14.60	MINIMUM	5.75
33.40	MAXIMUM	13.15
SKEWNESS		0.98
KURTOSIS		4.88
COEFFICIENT OF VARIATION		12.5%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
21.94	MEAN	8.64
0.07	STD ERROR (MEAN)	0.03
2.56	STANDARD DEVIATION	1.01
0.05	STD ERROR (STD DEV)	0.02
15.80	MINIMUM	6.22
34.70	MAXIMUM	13.66
SKEWNESS		0.65
KURTOSIS		3.87
COEFFICIENT OF VARIATION		11.7%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	14.25	-	14.75					
1	0.16	2	0.32	14.75	-	15.25					
8	1.29	10	1.61	15.25	-	15.75					
17	2.74	27	4.35	15.75	-	16.25		1	0.08	1	0.08
20	3.23	47	7.58	16.25	-	16.75		4	0.31	5	0.38
28	4.52	75	12.10	16.75	-	17.25		8	0.61	13	1.00
44	7.10	119	19.19	17.25	-	17.75		24	1.84	37	2.84
52	8.39	171	27.58	17.75	-	18.25		32	2.46	69	5.30
58	9.35	229	36.94	18.25	-	18.75		46	3.54	115	8.84
55	8.87	284	45.81	18.75	-	19.25		65	5.00	180	13.84
46	7.42	330	53.23	19.25	-	19.75		89	6.84	269	20.68
67	10.81	397	64.03	19.75	-	20.25		87	6.69	356	27.36
45	7.26	442	71.29	20.25	-	20.75		102	7.84	458	35.20
24	3.87	466	75.16	20.75	-	21.25		109	8.38	567	43.58
31	5.00	497	80.16	21.25	-	21.75		98	7.53	665	51.11
33	5.32	530	85.48	21.75	-	22.25		103	7.92	768	59.03
15	2.42	545	87.90	22.25	-	22.75		83	6.38	851	65.41
16	2.58	561	90.48	22.75	-	23.25		92	7.07	943	72.48
18	2.90	579	93.39	23.25	-	23.75		54	4.15	997	76.63
6	0.97	585	94.35	23.75	-	24.25		65	5.00	1062	81.63
7	1.13	592	95.48	24.25	-	24.75		58	4.46	1120	86.09
8	1.29	600	96.77	24.75	-	25.25		52	4.00	1172	90.08
5	0.81	605	97.58	25.25	-	25.75		37	2.84	1209	92.93
3	0.48	608	98.06	25.75	-	26.25		24	1.84	1233	94.77
5	0.81	613	98.87	26.25	-	26.75		15	1.15	1248	95.93
1	0.16	614	99.03	26.75	-	27.25		16	1.23	1264	97.16
1	0.16	615	99.19	27.25	-	27.75		12	0.92	1276	98.08
0	0.00	615	99.19	27.75	-	28.25		7	0.54	1283	98.62
3	0.48	618	99.68	28.25	-	28.75		5	0.38	1288	99.00
1	0.16	619	99.84	28.75	-	29.25		4	0.31	1292	99.31
0	0.00	619	99.84	29.25	-	29.75		0	0.00	1292	99.31
0	0.00	619	99.84	29.75	-	30.25		1	0.08	1293	99.39
0	0.00	619	99.84	30.25	-	30.75		1	0.08	1294	99.46
0	0.00	619	99.84	30.75	-	31.25		2	0.15	1296	99.62
0	0.00	619	99.84	31.25	-	31.75		1	0.08	1297	99.69
0	0.00	619	99.84	31.75	-	32.25		1	0.08	1298	99.77
0	0.00	619	99.84	32.25	-	32.75		1	0.08	1299	99.85
0	0.00	619	99.84	32.75	-	33.25		1	0.08	1300	99.92
1	0.16	620	100.00	33.25	-	33.75		0	0.00	1300	99.92
				33.75	-	34.25		0	0.00	1300	99.92
				34.25	-	34.75		1	0.08	1301	100.00

(90) WAIST FRONT LENGTH, SITTING

The surface distance between the suprasternale landmark and the anterior omphalion landmark is measured with a tape. The participant is in the anthropometric sitting position with the head in the Frankfurt plane and the arms relaxed at the sides. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
30.80	12.13	1ST	32.70	12.87
31.10	12.24	2ND	33.50	13.19
31.36	12.35	3RD	33.91	13.35
32.30	12.72	5TH	34.50	13.58
33.01	12.99	10TH	35.30	13.90
33.50	13.19	15TH	35.90	14.13
34.00	13.39	20TH	36.40	14.33
34.30	13.50	25TH	36.80	14.49
34.50	13.58	30TH	37.20	14.65
34.80	13.70	35TH	37.60	14.80
35.00	13.78	40TH	37.90	14.92
35.40	13.94	45TH	38.20	15.04
35.60	14.02	50TH	38.50	15.16
35.86	14.11	55TH	38.90	15.31
36.10	14.21	60TH	39.30	15.47
36.50	14.37	65TH	39.60	15.59
36.80	14.49	70TH	40.00	15.75
37.10	14.61	75TH	40.40	15.91
37.50	14.76	80TH	40.80	16.06
38.00	14.96	85TH	41.40	16.30
38.50	15.16	90TH	42.00	16.54
39.60	15.59	95TH	43.00	16.93
40.24	15.84	97TH	43.50	17.13
40.56	15.96	98TH	44.10	17.36
41.38	16.29	99TH	44.70	17.60

(90) WAIST FRONT LENGTH, SITTING

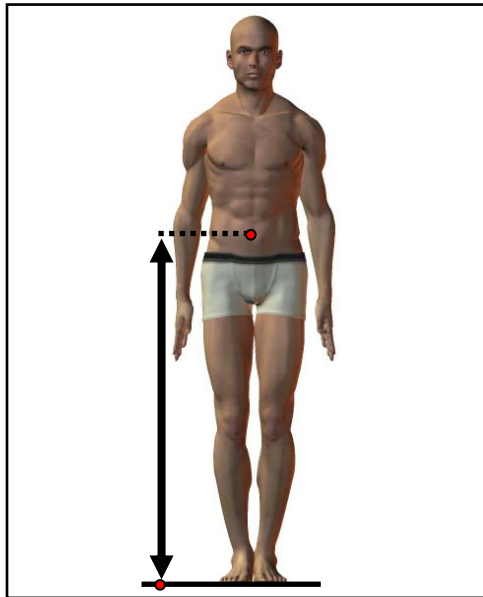
FEMALES		
CM		IN
35.71	MEAN	14.06
0.09	STD ERROR (MEAN)	0.03
2.21	STANDARD DEVIATION	0.87
0.06	STD ERROR (STD DEV)	0.02
29.20	MINIMUM	11.50
42.00	MAXIMUM	16.54
SKEWNESS		0.15
KURTOSIS		3.01
COEFFICIENT OF VARIATION		6.2%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
38.61	MEAN	15.20
0.07	STD ERROR (MEAN)	0.03
2.59	STANDARD DEVIATION	1.02
0.05	STD ERROR (STD DEV)	0.02
32.10	MINIMUM	12.64
47.20	MAXIMUM	18.58
SKEWNESS		0.12
KURTOSIS		2.77
COEFFICIENT OF VARIATION		6.7%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	28.75	-	29.25					
0	0.00	1	0.16	29.25	-	29.75					
2	0.32	3	0.48	29.75	-	30.25					
2	0.32	5	0.81	30.25	-	30.75					
11	1.77	16	2.58	30.75	-	31.25					
6	0.97	22	3.55	31.25	-	31.75					
8	1.29	30	4.84	31.75	-	32.25		3	0.23	3	0.23
23	3.71	53	8.55	32.25	-	32.75		10	0.77	13	1.00
19	3.06	72	11.61	32.75	-	33.25		4	0.31	17	1.31
43	6.94	115	18.55	33.25	-	33.75		17	1.31	34	2.61
37	5.97	152	24.52	33.75	-	34.25		14	1.08	48	3.69
61	9.84	213	34.35	34.25	-	34.75		43	3.31	91	6.99
50	8.06	263	42.42	34.75	-	35.25		32	2.46	123	9.45
71	11.45	334	53.87	35.25	-	35.75		59	4.53	182	13.99
52	8.39	386	62.26	35.75	-	36.25		65	5.00	247	18.99
42	6.77	428	69.03	36.25	-	36.75		70	5.38	317	24.37
49	7.90	477	76.94	36.75	-	37.25		91	6.99	408	31.36
34	5.48	511	82.42	37.25	-	37.75		86	6.61	494	37.97
30	4.84	541	87.26	37.75	-	38.25		102	7.84	596	45.81
20	3.23	561	90.48	38.25	-	38.75		95	7.30	691	53.11
17	2.74	578	93.23	38.75	-	39.25		87	6.69	778	59.80
16	2.58	594	95.81	39.25	-	39.75		92	7.07	870	66.87
8	1.29	602	97.10	39.75	-	40.25		85	6.53	955	73.41
7	1.13	609	98.23	40.25	-	40.75		79	6.07	1034	79.48
4	0.65	613	98.87	40.75	-	41.25		59	4.53	1093	84.01
6	0.97	619	99.84	41.25	-	41.75		58	4.46	1151	88.47
1	0.16	620	100.00	41.75	-	42.25		35	2.69	1186	91.16
				42.25	-	42.75		36	2.77	1222	93.93
				42.75	-	43.25		29	2.23	1251	96.16
				43.25	-	43.75		17	1.31	1268	97.46
				43.75	-	44.25		11	0.85	1279	98.31
				44.25	-	44.75		11	0.85	1290	99.15
				44.75	-	45.25		4	0.31	1294	99.46
				45.25	-	45.75		4	0.31	1298	99.77
				45.75	-	46.25		1	0.08	1299	99.85
				46.25	-	46.75		0	0.00	1299	99.85
				46.75	-	47.25		2	0.15	1301	100.00

(91) WAIST HEIGHT (OMPHALION)

The vertical distance between a standing surface and the anterior omphalion landmark is measured with an anthropometer. The participant stands erect, looking straight ahead. The heels are together with the weight distributed equally on both feet. The shoulders and upper extremities are relaxed. The measurement is made at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
87.76	34.56	1ST	94.81	37.32
88.50	34.84	2ND	96.11	37.83
89.20	35.12	3RD	96.80	38.11
90.21	35.51	5TH	97.80	38.50
91.50	36.02	10TH	99.30	39.09
93.00	36.61	15TH	100.50	39.57
93.92	36.98	20TH	101.50	39.96
94.60	37.24	25TH	102.30	40.28
95.40	37.56	30TH	103.00	40.55
96.20	37.87	35TH	103.87	40.90
96.70	38.07	40TH	104.50	41.14
97.30	38.31	45TH	105.10	41.38
97.80	38.50	50TH	105.70	41.61
98.50	38.78	55TH	106.30	41.85
99.40	39.13	60TH	107.10	42.17
99.90	39.33	65TH	107.73	42.41
100.50	39.57	70TH	108.40	42.68
101.10	39.80	75TH	109.20	42.99
101.90	40.12	80TH	110.16	43.37
102.80	40.47	85TH	111.40	43.86
103.79	40.87	90TH	113.00	44.49
105.10	41.38	95TH	115.20	45.35
106.77	42.04	97TH	116.79	45.98
107.56	42.34	98TH	117.20	46.14
109.92	43.28	99TH	118.99	46.84

(91) WAIST HEIGHT (OMPHALION)

FEMALES		
CM		IN
97.93	MEAN	38.55
0.19	STD ERROR (MEAN)	0.07
4.65	STANDARD DEVIATION	1.83
0.13	STD ERROR (STD DEV)	0.05
84.40	MINIMUM	33.23
113.50	MAXIMUM	44.69
SKEWNESS		0.07
KURTOSIS		2.91
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
105.94	MEAN	41.71
0.14	STD ERROR (MEAN)	0.06
5.19	STANDARD DEVIATION	2.04
0.10	STD ERROR (STD DEV)	0.04
91.10	MINIMUM	35.87
121.80	MAXIMUM	47.95
SKEWNESS		0.23
KURTOSIS		2.92
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	83.55	-	84.55					
0	0.00	1	0.16	84.55	-	85.55					
0	0.00	1	0.16	85.55	-	86.55					
3	0.48	4	0.65	86.55	-	87.55					
9	1.45	13	2.10	87.55	-	88.55					
9	1.45	22	3.55	88.55	-	89.55					
16	2.58	38	6.13	89.55	-	90.55					
26	4.19	64	10.32	90.55	-	91.55		1	0.08	1	0.08
15	2.42	79	12.74	91.55	-	92.55		1	0.08	2	0.15
30	4.84	109	17.58	92.55	-	93.55		2	0.15	4	0.31
44	7.10	153	24.68	93.55	-	94.55		7	0.54	11	0.85
37	5.97	190	30.65	94.55	-	95.55		5	0.38	16	1.23
51	8.23	241	38.87	95.55	-	96.55		17	1.31	33	2.54
50	8.06	291	46.94	96.55	-	97.55		24	1.84	57	4.38
53	8.55	344	55.48	97.55	-	98.55		37	2.84	94	7.23
38	6.13	382	61.61	98.55	-	99.55		48	3.69	142	10.91
53	8.55	435	70.16	99.55	-	100.55		56	4.30	198	15.22
50	8.06	485	78.23	100.55	-	101.55		64	4.92	262	20.14
33	5.32	518	83.55	101.55	-	102.55		86	6.61	348	26.75
34	5.48	552	89.03	102.55	-	103.55		79	6.07	427	32.82
27	4.35	579	93.39	103.55	-	104.55		98	7.53	525	40.35
15	2.42	594	95.81	104.55	-	105.55		103	7.92	628	48.27
7	1.13	601	96.94	105.55	-	106.55		110	8.46	738	56.73
7	1.13	608	98.06	106.55	-	107.55		89	6.84	827	63.57
4	0.65	612	98.71	107.55	-	108.55		98	7.53	925	71.10
0	0.00	612	98.71	108.55	-	109.55		83	6.38	1008	77.48
4	0.65	616	99.35	109.55	-	110.55		56	4.30	1064	81.78
2	0.32	618	99.68	110.55	-	111.55		51	3.92	1115	85.70
1	0.16	619	99.84	111.55	-	112.55		46	3.54	1161	89.24
1	0.16	620	100.00	112.55	-	113.55		30	2.31	1191	91.54
				113.55	-	114.55		32	2.46	1223	94.00
				114.55	-	115.55		21	1.61	1244	95.62
				115.55	-	116.55		17	1.31	1261	96.93
				116.55	-	117.55		19	1.46	1280	98.39
				117.55	-	118.55		8	0.61	1288	99.00
				118.55	-	119.55		3	0.23	1291	99.23
				119.55	-	120.55		4	0.31	1295	99.54
				120.55	-	121.55		4	0.31	1299	99.85
				121.55	-	122.55		2	0.15	1301	100.00

(92) WEIGHT

The weight of the participant is taken to the nearest tenth of a kilogram. The participant stands on the platform of a scale with the weight distributed evenly on both feet.



PERCENTILES				
FEMALES			MALES	
<u>KG</u>	<u>LB</u>		<u>KG</u>	<u>LB</u>
47.33	104.34	1ST	57.40	126.53
48.33	106.54	2ND	58.80	129.63
49.28	108.65	3RD	60.39	133.15
50.87	112.14	5TH	62.48	137.75
53.32	117.55	10TH	65.70	144.84
55.31	121.93	15TH	68.50	151.02
56.88	125.40	20TH	70.40	155.20
57.90	127.65	25TH	71.90	158.51
58.60	129.19	30TH	73.60	162.26
59.79	131.82	35TH	75.00	165.35
60.76	133.95	40TH	76.60	168.87
62.30	137.35	45TH	77.90	171.74
63.30	139.55	50TH	79.90	176.15
64.07	141.24	55TH	81.40	179.45
65.14	143.61	60TH	83.10	183.20
66.20	145.94	65TH	84.87	187.10
67.40	148.59	70TH	86.60	190.92
68.50	151.02	75TH	88.25	194.56
70.10	154.54	80TH	90.80	200.18
71.48	157.59	85TH	93.13	205.32
74.66	164.59	90TH	96.52	212.78
77.29	170.40	95TH	101.72	224.25
80.52	177.51	97TH	104.22	229.76
83.59	184.28	98TH	106.92	235.71
88.17	194.39	99TH	111.10	244.93

(92) WEIGHT

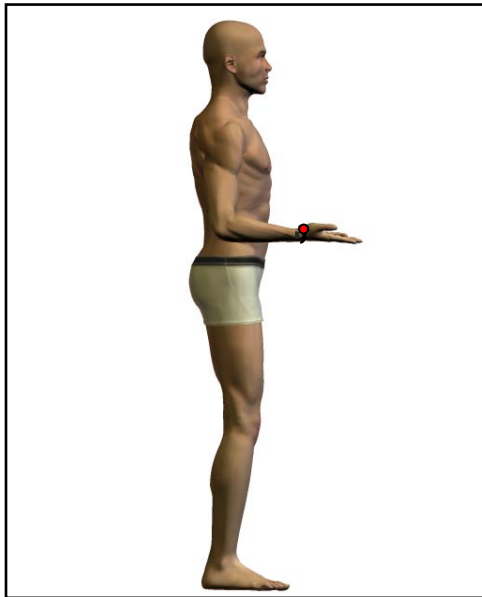
FEMALES		
<u>KG</u>		<u>LB</u>
63.60	MEAN	140.22
0.34	STD ERROR (MEAN)	0.75
8.40	STANDARD DEVIATION	18.53
0.24	STD ERROR (STD DEV)	0.53
44.00	MINIMUM	97.00
113.80	MAXIMUM	250.88
SKEWNESS		0.76
KURTOSIS		5.19
COEFFICIENT OF VARIATION		13.2%
NUMBER OF PARTICIPANTS		613

MALES		
<u>KG</u>		<u>LB</u>
80.60	MEAN	177.68
0.33	STD ERROR (MEAN)	0.73
11.88	STANDARD DEVIATION	26.18
0.23	STD ERROR (STD DEV)	0.51
51.90	MINIMUM	114.42
123.10	MAXIMUM	271.39
SKEWNESS		0.36
KURTOSIS		2.96
COEFFICIENT OF VARIATION		14.7%
NUMBER OF PARTICIPANTS		1297

FEMALES				FREQUENCIES				MALES			
<u>F</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>KG</u>				<u>F</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	42.55	-	44.55					
2	0.33	3	0.49	44.55	-	46.55					
11	1.79	14	2.28	46.55	-	48.55					
11	1.79	25	4.08	48.55	-	50.55					
28	4.57	53	8.65	50.55	-	52.55		2	0.15	2	0.15
26	4.24	79	12.89	52.55	-	54.55		2	0.15	4	0.31
36	5.87	115	18.76	54.55	-	56.55		7	0.54	11	0.85
66	10.77	181	29.53	56.55	-	58.55		13	1.00	24	1.85
59	9.62	240	39.15	58.55	-	60.55		20	1.54	44	3.39
43	7.01	283	46.17	60.55	-	62.55		22	1.70	66	5.09
69	11.26	352	57.42	62.55	-	64.55		40	3.08	106	8.17
58	9.46	410	66.88	64.55	-	66.55		37	2.85	143	11.03
52	8.48	462	75.37	66.55	-	68.55		52	4.01	195	15.03
36	5.87	498	81.24	68.55	-	70.55		76	5.86	271	20.89
38	6.20	536	87.44	70.55	-	72.55		76	5.86	347	26.75
15	2.45	551	89.89	72.55	-	74.55		85	6.55	432	33.31
26	4.24	577	94.13	74.55	-	76.55		85	6.55	517	39.86
10	1.63	587	95.76	76.55	-	78.55		85	6.55	602	46.41
8	1.31	595	97.06	78.55	-	80.55		74	5.71	676	52.12
4	0.65	599	97.72	80.55	-	82.55		81	6.25	757	58.37
4	0.65	603	98.37	82.55	-	84.55		73	5.63	830	63.99
2	0.33	605	98.69	84.55	-	86.55		74	5.71	904	69.70
3	0.49	608	99.18	86.55	-	88.55		83	6.40	987	76.10
0	0.00	608	99.18	88.55	-	90.55		45	3.47	1032	79.57
3	0.49	611	99.67	90.55	-	92.55		54	4.16	1086	83.73
1	0.16	612	99.84	92.55	-	94.55		51	3.93	1137	87.66
0	0.00	612	99.84	94.55	-	96.55		31	2.39	1168	90.05
0	0.00	612	99.84	96.55	-	98.55		35	2.70	1203	92.75
0	0.00	612	99.84	98.55	-	100.55		22	1.70	1225	94.45
0	0.00	612	99.84	100.55	-	102.55		15	1.16	1240	95.61
0	0.00	612	99.84	102.55	-	104.55		20	1.54	1260	97.15
0	0.00	612	99.84	104.55	-	106.55		10	0.77	1270	97.92
0	0.00	612	99.84	106.55	-	108.55		7	0.54	1277	98.46
0	0.00	612	99.84	108.55	-	110.55		6	0.46	1283	98.92
0	0.00	612	99.84	110.55	-	112.55		7	0.54	1290	99.46
1	0.16	613	100.00	112.55	-	114.55		1	0.08	1291	99.54
				114.55	-	116.55		1	0.08	1292	99.61
				116.55	-	118.55		1	0.08	1293	99.69
				118.55	-	120.55		1	0.08	1294	99.77
				120.55	-	122.55		2	0.15	1296	99.92
				122.55	-	124.55		1	0.08	1297	100.00

(93) WRIST CIRCUMFERENCE

The circumference of the wrist, perpendicular to the long axis of the forearm, is measured with a tape passing over the stylium landmark. The participant extends the right arm forward with the palm up.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
14.00	5.51	1ST	15.90	6.26
14.10	5.55	2ND	16.00	6.30
14.10	5.55	3RD	16.20	6.38
14.30	5.63	5TH	16.40	6.46
14.50	5.71	10TH	16.60	6.54
14.70	5.79	15TH	16.80	6.61
14.80	5.83	20TH	17.00	6.69
14.90	5.87	25TH	17.10	6.73
15.00	5.91	30TH	17.26	6.79
15.10	5.94	35TH	17.40	6.85
15.20	5.98	40TH	17.40	6.85
15.30	6.02	45TH	17.50	6.89
15.40	6.06	50TH	17.60	6.93
15.40	6.06	55TH	17.70	6.97
15.50	6.10	60TH	17.80	7.01
15.60	6.14	65TH	18.00	7.09
15.70	6.18	70TH	18.10	7.13
15.80	6.22	75TH	18.20	7.17
15.90	6.26	80TH	18.40	7.24
16.00	6.30	85TH	18.60	7.32
16.20	6.38	90TH	18.80	7.40
16.50	6.50	95TH	19.10	7.52
16.70	6.57	97TH	19.40	7.64
16.80	6.61	98TH	19.60	7.72
17.00	6.69	99TH	19.70	7.76

(93) WRIST CIRCUMFERENCE

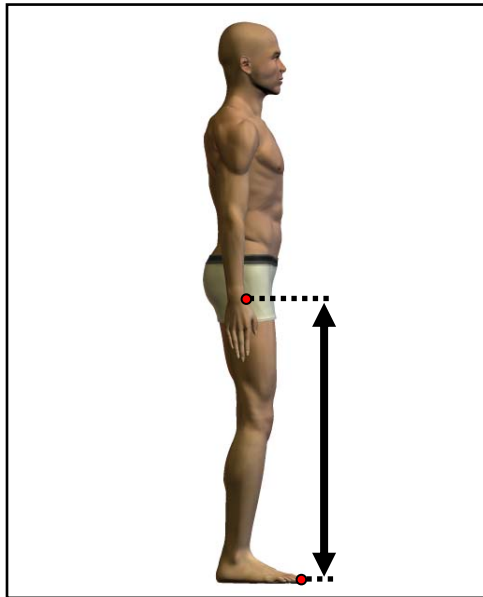
FEMALES		
<u>CM</u>		<u>IN</u>
15.36	MEAN	6.05
0.03	STD ERROR (MEAN)	0.01
0.67	STANDARD DEVIATION	0.27
0.02	STD ERROR (STD DEV)	0.01
13.50	MINIMUM	5.31
18.90	MAXIMUM	7.44
SKEWNESS		0.38
KURTOSIS		3.92
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
17.69	MEAN	6.96
0.02	STD ERROR (MEAN)	0.01
0.83	STANDARD DEVIATION	0.33
0.02	STD ERROR (STD DEV)	0.01
15.10	MINIMUM	5.94
20.50	MAXIMUM	8.07
SKEWNESS		0.22
KURTOSIS		3.04
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	13.35	-	13.55					
1	0.16	2	0.32	13.55	-	13.75					
3	0.48	5	0.81	13.75	-	13.95					
14	2.26	19	3.06	13.95	-	14.15					
21	3.39	40	6.45	14.15	-	14.35					
25	4.03	65	10.48	14.35	-	14.55					
55	8.87	120	19.35	14.55	-	14.75					
47	7.58	167	26.94	14.75	-	14.95					
65	10.48	232	37.42	14.95	-	15.15		1	0.08	1	0.08
77	12.42	309	49.84	15.15	-	15.35		0	0.00	1	0.08
90	14.52	399	64.35	15.35	-	15.55		4	0.31	5	0.38
62	10.00	461	74.35	15.55	-	15.75		3	0.23	8	0.61
40	6.45	501	80.81	15.75	-	15.95		8	0.61	16	1.23
45	7.26	546	88.06	15.95	-	16.15		18	1.38	34	2.61
24	3.87	570	91.94	16.15	-	16.35		25	1.92	59	4.53
23	3.71	593	95.65	16.35	-	16.55		41	3.15	100	7.69
12	1.94	605	97.58	16.55	-	16.75		68	5.23	168	12.91
8	1.29	613	98.87	16.75	-	16.95		58	4.46	226	17.37
2	0.32	615	99.19	16.95	-	17.15		102	7.84	328	25.21
3	0.48	618	99.68	17.15	-	17.35		124	9.53	452	34.74
1	0.16	619	99.84	17.35	-	17.55		146	11.22	598	45.96
0	0.00	619	99.84	17.55	-	17.75		127	9.76	725	55.73
0	0.00	619	99.84	17.75	-	17.95		114	8.76	839	64.49
0	0.00	619	99.84	17.95	-	18.15		105	8.07	944	72.56
0	0.00	619	99.84	18.15	-	18.35		82	6.30	1026	78.86
0	0.00	619	99.84	18.35	-	18.55		78	6.00	1104	84.86
0	0.00	619	99.84	18.55	-	18.75		59	4.53	1163	89.39
1	0.16	620	100.00	18.75	-	18.95		40	3.07	1203	92.47
				18.95	-	19.15		39	3.00	1242	95.47
				19.15	-	19.35		15	1.15	1257	96.62
				19.35	-	19.55		17	1.31	1274	97.92
				19.55	-	19.75		18	1.38	1292	99.31
				19.75	-	19.95		4	0.31	1296	99.62
				19.95	-	20.15		1	0.08	1297	99.69
				20.15	-	20.35		2	0.15	1299	99.85
				20.35	-	20.55		2	0.15	1301	100.00

(94) WRIST HEIGHT

The vertical distance between a standing surface and the stylium landmark is measured with an anthropometer. The participant stands erect, looking straight ahead with the heels together and the weight distributed equally on both feet. The shoulders are relaxed, and the arms are extended downwards with the elbow, wrist, and fingers held rigidly straight. The arms lightly touch the sides. The measurement is taken at the maximum point of quiet respiration.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
70.74	27.85	1ST	74.40	29.29
71.78	28.26	2ND	75.71	29.80
72.30	28.46	3RD	76.40	30.08
72.90	28.70	5TH	77.11	30.35
74.30	29.25	10TH	78.50	30.91
75.10	29.57	15TH	79.40	31.26
75.52	29.73	20TH	80.20	31.57
76.10	29.96	25TH	80.80	31.81
76.53	30.13	30TH	81.50	32.09
77.00	30.31	35TH	82.10	32.32
77.50	30.51	40TH	82.60	32.52
78.00	30.71	45TH	83.00	32.68
78.70	30.98	50TH	83.50	32.87
79.10	31.14	55TH	84.00	33.07
79.50	31.30	60TH	84.60	33.31
80.00	31.50	65TH	85.20	33.54
80.57	31.72	70TH	85.90	33.82
81.10	31.93	75TH	86.50	34.06
82.20	32.36	80TH	87.00	34.25
82.80	32.60	85TH	88.09	34.68
83.90	33.03	90TH	89.19	35.12
85.50	33.66	95TH	91.10	35.87
86.30	33.98	97TH	92.20	36.30
87.26	34.35	98TH	93.10	36.65
88.18	34.71	99TH	94.40	37.17

(94) WRIST HEIGHT

FEMALES		
CM		IN
78.80	MEAN	31.02
0.15	STD ERROR (MEAN)	0.06
3.74	STANDARD DEVIATION	1.47
0.11	STD ERROR (STD DEV)	0.04
68.70	MINIMUM	27.05
89.40	MAXIMUM	35.20
SKEWNESS		0.27
KURTOSIS		2.77
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
83.75	MEAN	32.97
0.12	STD ERROR (MEAN)	0.05
4.21	STANDARD DEVIATION	1.66
0.08	STD ERROR (STD DEV)	0.03
71.50	MINIMUM	28.15
98.70	MAXIMUM	38.86
SKEWNESS		0.27
KURTOSIS		3.09
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	68.55	-	69.55		1	0.08	1	0.08
3	0.48	4	0.65	69.55	-	70.55		0	0.00	1	0.08
5	0.81	9	1.45	70.55	-	71.55		2	0.15	3	0.23
13	2.10	22	3.55	71.55	-	72.55		10	0.77	13	1.00
21	3.39	43	6.94	72.55	-	73.55		11	0.85	24	1.85
27	4.35	70	11.29	73.55	-	74.55		20	1.54	44	3.38
54	8.71	124	20.00	74.55	-	75.55		32	2.46	76	5.85
62	10.00	186	30.00	75.55	-	76.55		62	4.77	138	10.62
64	10.32	250	40.32	76.55	-	77.55		67	5.15	205	15.77
52	8.39	302	48.71	77.55	-	78.55		88	6.77	293	22.54
71	11.45	373	60.16	78.55	-	79.55		102	7.85	395	30.38
61	9.84	434	70.00	79.55	-	80.55		123	9.46	518	39.85
45	7.26	479	77.26	80.55	-	81.55		140	10.77	658	50.62
32	5.16	511	82.42	81.55	-	82.55		113	8.69	771	59.31
38	6.13	549	88.55	82.55	-	83.55		104	8.00	875	67.31
26	4.19	575	92.74	83.55	-	84.55		107	8.23	982	75.54
16	2.58	591	95.32	84.55	-	85.55		90	6.92	1072	82.46
12	1.94	603	97.26	85.55	-	86.55		65	5.00	1137	87.46
9	1.45	612	98.71	86.55	-	87.55		48	3.69	1185	91.15
5	0.81	617	99.52	87.55	-	88.55		35	2.69	1220	93.85
3	0.48	620	100.00	88.55	-	89.55		31	2.38	1251	96.23
				89.55	-	90.55		14	1.08	1265	97.31
				90.55	-	91.55		12	0.92	1277	98.23
				91.55	-	92.55		11	0.85	1288	99.08
				92.55	-	93.55		5	0.38	1293	99.46
				93.55	-	94.55		4	0.31	1297	99.77
				94.55	-	95.55		0	0.00	1297	99.77
				95.55	-	96.55		2	0.15	1299	99.92
				96.55	-	97.55		1	0.08	1300	100.00
				97.55	-	98.55					
				98.55	-	99.55					

CHAPTER V

THE DERIVED DIMENSIONS

While time and cost demand a reasonable limit to the number of dimensions that can be measured in an anthropometric survey, many additional dimensions can be calculated from the measured data. Forty-one additional dimensions, concentrated in areas applicable to clothing, workspace, and analog design, were derived from the measured dimensions in this survey. These derived dimensions are intended to meet some of the more specialized needs of designers and engineers, though users should be cautioned that derived dimensions may not be as reliable as data obtained by direct measurement.

Generally, derived dimensions are calculated from directly measured dimensions, one at a time, for each individual. The summary statistics are calculated from those individual values. In some cases, particularly those involving functional reaches with different hand positions, a component dimension was not measured in this survey, but was measured previously in ANSUR. In those cases the ANSUR male and female mean values were used in the calculations of derived dimensions for the Marines. For example, to calculate Index Finger Reach for males, 12.44 cm (the male ANSUR mean of Wrist-Thumbtip Length) was subtracted from each male Marine's measured Thumbtip Reach, and 18.80 cm (the male ANSUR mean of Wrist-Index Finger Length) was added to that amount. All the ANSUR mean values used in these calculations are seen in Table 17.

This approach is sound because the ANSUR II pilot study (Paquette et al., 2009) showed that no secular change in Hand Length has occurred in the last two decades and there is no empirical evidence to suggest that Marine finger lengths or other significant hand dimensions are different from those in the Army. Further, the largest part of the population variability in these dimensions is due to arm length and positioning, not to the dimensions of the hand, which comprise a small part of each of these dimensions.

Two dimensions which were derived in ANSUR were directly measured in this survey. Forearm-Center of Grip (termed Elbow-Center of Grip in ANSUR) was measured with a modified beam caliper, as the intervening years since ANSUR had shown that it was an extremely useful dimension and thus would be better measured than calculated. Thumbtip Reach was also measured directly, this time using it as the anchor dimension from which other reaches could be calculated.

TABLE 17

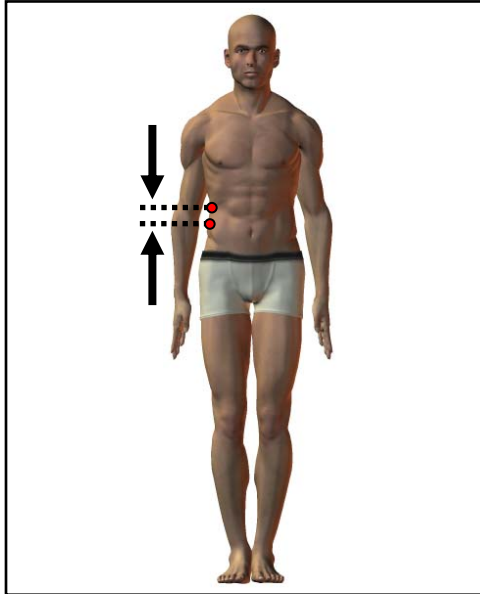
ANSUR Mean Values Used in Derived Dimensions
(values in cm)

Dimension	Males	Females
Hand Length	19.38	18.05
Wrist-Center of Grip Length	6.97	6.63
Wrist-Index Finger Length	18.08	16.92
Wrist-Thumbtip Length	12.44	11.76
Wrist-Wall Length	68.09	61.98

A visual index, designed to assist the reader in locating particular derived dimensions whose names may be unfamiliar, appears in Appendix D. The numbers on the visual index correspond to the derived dimension number. Completing this section are the data pages, which include brief dimension descriptions, summary statistics, and percentile and frequency tables.

(D1) ABDOMINAL LINK

The vertical distance between the tenth rib landmark and the iliocristale landmark on the right side is calculated as follows: TENTH RIB HEIGHT minus ILIOCRISTALE HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
1.24	0.49	1ST	2.30	0.91
1.60	0.63	2ND	2.70	1.06
1.70	0.67	3RD	2.90	1.14
2.00	0.79	5TH	3.10	1.22
2.30	0.91	10TH	3.50	1.38
2.60	1.02	15TH	3.80	1.50
2.80	1.10	20TH	4.00	1.57
3.03	1.19	25TH	4.20	1.65
3.20	1.26	30TH	4.30	1.69
3.34	1.31	35TH	4.50	1.77
3.50	1.38	40TH	4.70	1.85
3.60	1.42	45TH	4.80	1.89
3.70	1.46	50TH	5.00	1.97
3.90	1.54	55TH	5.10	2.01
4.00	1.57	60TH	5.30	2.09
4.20	1.65	65TH	5.50	2.17
4.40	1.73	70TH	5.70	2.24
4.60	1.81	75TH	6.00	2.36
4.88	1.92	80TH	6.30	2.48
5.10	2.01	85TH	6.50	2.56
5.50	2.17	90TH	6.90	2.72
6.00	2.36	95TH	7.40	2.91
6.30	2.48	97TH	7.70	3.03
6.60	2.60	98TH	7.90	3.11
6.90	2.72	99TH	8.50	3.35

(D1) ABDOMINAL LINK

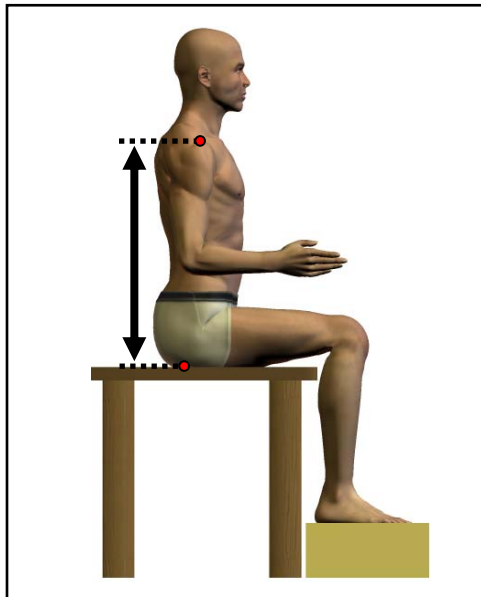
FEMALES		
<u>CM</u>		<u>IN</u>
3.84	MEAN	1.51
0.05	STD. ERROR (MEAN)	0.02
1.22	STANDARD DEVIATION	0.48
0.03	STD. ERROR (STD.DEV)	0.01
0.90	MINIMUM	0.35
7.70	MAXIMUM	3.03
SKEWNESS		0.30
KURTOSIS		2.95
COEFFICIENT OF VARIATION		31.8%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
5.11	MEAN	2.01
0.04	STD. ERROR (MEAN)	0.01
1.35	STANDARD DEVIATION	0.53
0.03	STD. ERROR (STD.DEV)	0.01
0.90	MINIMUM	0.35
11.70	MAXIMUM	4.61
SKEWNESS		0.55
KURTOSIS		3.83
COEFFICIENT OF VARIATION		26.4%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES		MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>F</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
2	0.32	2	0.32	0.85	-	1	0.08	1	0.08
4	0.65	6	0.97	1.10	-	0	0.00	1	0.08
5	0.81	11	1.77	1.35	-	0	0.00	1	0.08
16	2.58	27	4.35	1.60	-	0	0.00	1	0.08
13	2.10	40	6.45	1.85	-	3	0.23	4	0.31
33	5.32	73	11.77	2.10	-	9	0.69	13	1.00
19	3.06	92	14.84	2.35	-	6	0.46	19	1.46
36	5.81	128	20.65	2.60	-	16	1.23	35	2.69
27	4.35	155	25.00	2.85	-	18	1.38	53	4.08
62	10.00	217	35.00	3.10	-	40	3.08	93	7.15
44	7.10	261	42.10	3.35	-	40	3.08	133	10.23
66	10.65	327	52.74	3.60	-	91	7.00	224	17.23
50	8.06	377	60.81	3.85	-	64	4.92	288	22.15
50	8.06	427	68.87	4.10	-	104	8.00	392	30.15
23	3.71	450	72.58	4.35	-	83	6.38	475	36.54
46	7.42	496	80.00	4.60	-	131	10.08	606	46.62
24	3.87	520	83.87	4.85	-	78	6.00	684	52.62
26	4.19	546	88.06	5.10	-	108	8.31	792	60.92
21	3.39	567	91.45	5.35	-	63	4.85	855	65.77
18	2.90	585	94.35	5.60	-	89	6.85	944	72.62
7	1.13	592	95.48	5.85	-	60	4.62	1004	77.23
12	1.94	604	97.42	6.10	-	57	4.38	1061	81.62
2	0.32	606	97.74	6.35	-	45	3.46	1106	85.08
7	1.13	613	98.87	6.60	-	48	3.69	1154	88.77
2	0.32	615	99.19	6.85	-	32	2.46	1186	91.23
3	0.48	618	99.68	7.10	-	37	2.85	1223	94.08
0	0.00	618	99.68	7.35	-	26	2.00	1249	96.08
2	0.32	620	100.00	7.60	-	20	1.54	1269	97.62
				7.85	-	9	0.69	1278	98.31
				8.10	-	8	0.62	1286	98.92
				8.35	-	2	0.15	1288	99.08
				8.60	-	2	0.15	1290	99.23
				8.85	-	0	0.00	1290	99.23
				9.10	-	2	0.15	1292	99.38
				9.35	-	2	0.15	1294	99.54
				9.60	-	1	0.08	1295	99.62
				9.85	-	2	0.15	1297	99.77
				10.10	-	0	0.00	1297	99.77
				10.35	-	0	0.00	1297	99.77
				10.60	-	1	0.08	1298	99.85
				10.85	-	0	0.00	1298	99.85
				11.10	-	0	0.00	1298	99.85
				11.35	-	1	0.08	1299	99.92
				11.60	-	1	0.08	1300	100.00

(D2) ACROMIAL HEIGHT, SITTING

The vertical distance between a sitting surface and the right acromion landmark is calculated as follows: SITTING HEIGHT minus (STATURE minus ACROMIAL HEIGHT).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
50.32	19.81	1ST	53.40	21.02
50.94	20.06	2ND	53.90	21.22
51.30	20.20	3RD	54.40	21.42
52.00	20.47	5TH	55.30	21.77
52.90	20.83	10TH	56.20	22.13
53.70	21.14	15TH	56.80	22.36
54.30	21.38	20TH	57.40	22.60
54.80	21.57	25TH	57.90	22.80
55.10	21.69	30TH	58.30	22.95
55.40	21.81	35TH	58.70	23.11
55.80	21.97	40TH	59.10	23.27
56.20	22.13	45TH	59.50	23.43
56.50	22.24	50TH	59.90	23.58
56.80	22.36	55TH	60.21	23.70
57.10	22.48	60TH	60.70	23.90
57.50	22.64	65TH	61.10	24.06
57.80	22.76	70TH	61.50	24.21
58.20	22.91	75TH	61.90	24.37
58.80	23.15	80TH	62.40	24.57
59.30	23.35	85TH	63.00	24.80
60.20	23.70	90TH	63.80	25.12
61.40	24.17	95TH	65.09	25.63
62.10	24.45	97TH	65.80	25.91
62.70	24.69	98TH	66.40	26.14
63.58	25.03	99TH	67.50	26.57

(D2) ACROMIAL HEIGHT, SITTING

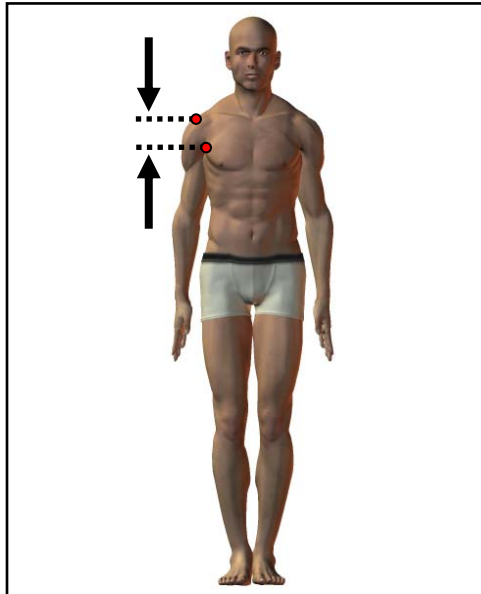
FEMALES		
CM		IN
56.53	MEAN	22.26
0.11	STD. ERROR (MEAN)	0.04
2.79	STANDARD DEVIATION	1.10
0.08	STD. ERROR (STD.DEV)	0.03
48.60	MINIMUM	19.13
64.20	MAXIMUM	25.28
SKEWNESS		0.12
KURTOSIS		-0.04
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
59.94	MEAN	23.60
0.08	STD. ERROR (MEAN)	0.03
2.97	STANDARD DEVIATION	1.17
0.06	STD. ERROR (STD.DEV)	0.02
49.50	MINIMUM	19.49
69.20	MAXIMUM	27.24
SKEWNESS		0.13
KURTOSIS		0.03
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	48.25	-	48.75					
1	0.16	2	0.32	48.75	-	49.25					
1	0.16	3	0.48	49.25	-	49.75		1	0.08	1	0.08
1	0.16	4	0.65	49.75	-	50.25		0	0.00	1	0.00
4	0.65	8	1.29	50.25	-	50.75		0	0.00	1	0.00
9	1.45	17	2.74	50.75	-	51.25		0	0.00	1	0.00
9	1.45	26	4.19	51.25	-	51.75		2	0.15	3	0.23
13	2.10	39	6.29	51.75	-	52.25		2	0.15	5	0.38
17	2.74	56	9.03	52.25	-	52.75		1	0.08	6	0.46
21	3.39	77	12.42	52.75	-	53.25		4	0.31	10	0.77
21	3.39	98	15.81	53.25	-	53.75		9	0.69	19	1.46
24	3.87	122	19.68	53.75	-	54.25		16	1.23	35	2.69
32	5.16	154	24.84	54.25	-	54.75		13	1.00	48	3.69
47	7.58	201	32.42	54.75	-	55.25		16	1.23	64	4.92
41	6.61	242	39.03	55.25	-	55.75		32	2.46	96	7.38
41	6.61	283	45.65	55.75	-	56.25		40	3.07	136	10.45
51	8.23	334	53.87	56.25	-	56.75		49	3.77	185	14.22
53	8.55	387	62.42	56.75	-	57.25		57	4.38	242	18.60
40	6.45	427	68.87	57.25	-	57.75		54	4.15	296	22.75
41	6.61	468	75.48	57.75	-	58.25		83	6.38	379	29.13
27	4.35	495	79.84	58.25	-	58.75		78	6.00	457	35.13
30	4.84	525	84.68	58.75	-	59.25		91	6.99	548	42.12
15	2.42	540	87.10	59.25	-	59.75		78	6.00	626	48.12
21	3.39	561	90.48	59.75	-	60.25		90	6.92	716	55.03
10	1.61	571	92.10	60.25	-	60.75		71	5.46	787	60.49
13	2.10	584	94.19	60.75	-	61.25		86	6.61	873	67.10
13	2.10	597	96.29	61.25	-	61.75		82	6.30	955	73.41
7	1.13	604	97.42	61.75	-	62.25		66	5.07	1021	78.48
5	0.81	609	98.23	62.25	-	62.75		66	5.07	1087	83.55
4	0.65	613	98.87	62.75	-	63.25		52	4.00	1139	87.55
4	0.65	617	99.52	63.25	-	63.75		31	2.38	1170	89.93
3	0.48	620	100.00	63.75	-	64.25		34	2.61	1204	92.54
				64.25	-	64.75		20	1.54	1224	94.08
				64.75	-	65.25		18	1.38	1242	95.47
				65.25	-	65.75		19	1.46	1261	96.93
				65.75	-	66.25		12	0.92	1273	97.85
				66.25	-	66.75		6	0.46	1279	98.31
				66.75	-	67.25		5	0.38	1284	98.69
				67.25	-	67.75		9	0.69	1293	99.39
				67.75	-	68.25		1	0.08	1294	99.46
				68.25	-	68.75		4	0.31	1298	99.77
				68.75	-	69.25		3	0.23	1301	100.00

(D3) ACROMION-AXILLA LENGTH

The vertical distance between the acromion right landmark and the anterior-scye-on-the-torso landmark of a participant standing erect with the arms relaxed at the sides is calculated as follows: ACROMIAL HEIGHT minus AXILLA HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
7.40	2.91	1ST	8.20	3.23
7.60	2.99	2ND	8.30	3.27
7.90	3.11	3RD	8.51	3.35
8.10	3.19	5TH	8.81	3.46
8.30	3.27	10TH	9.20	3.62
8.50	3.35	15TH	9.40	3.70
8.70	3.43	20TH	9.70	3.82
8.90	3.50	25TH	9.90	3.90
9.10	3.58	30TH	10.10	3.98
9.20	3.62	35TH	10.20	4.02
9.30	3.66	40TH	10.38	4.08
9.50	3.74	45TH	10.50	4.13
9.60	3.78	50TH	10.60	4.17
9.70	3.82	55TH	10.80	4.25
9.80	3.86	60TH	10.90	4.29
9.90	3.90	65TH	11.10	4.37
10.10	3.98	70TH	11.30	4.45
10.20	4.02	75TH	11.50	4.53
10.30	4.06	80TH	11.70	4.61
10.50	4.13	85TH	12.00	4.72
10.70	4.21	90TH	12.30	4.84
11.00	4.33	95TH	12.70	5.00
11.30	4.45	97TH	13.10	5.16
11.50	4.53	98TH	13.40	5.28
11.88	4.68	99TH	14.00	5.51

(D3) ACROMION-AXILLA LENGTH

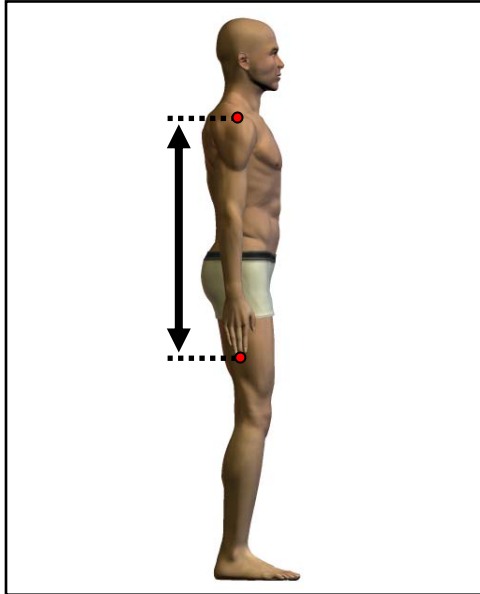
FEMALES		
CM		IN
9.56	MEAN	3.76
0.04	STD. ERROR (MEAN)	0.01
0.94	STANDARD DEVIATION	0.37
0.03	STD. ERROR (STD.DEV)	0.01
6.60	MINIMUM	2.60
12.40	MAXIMUM	4.88
SKEWNESS		-0.01
KURTOSIS		2.89
COEFFICIENT OF VARIATION		9.8%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
10.70	MEAN	4.21
0.03	STD. ERROR (MEAN)	0.01
1.21	STANDARD DEVIATION	0.47
0.02	STD. ERROR (STD.DEV)	0.01
7.50	MINIMUM	2.95
15.40	MAXIMUM	6.06
SKEWNESS		0.29
KURTOSIS		3.19
COEFFICIENT OF VARIATION		11.3%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	6.55	-	6.75					
0	0.00	1	0.16	6.75	-	6.95					
2	0.32	3	0.48	6.95	-	7.15					
1	0.16	4	0.65	7.15	-	7.35					
7	1.13	11	1.77	7.35	-	7.55		3	0.23	3	0.23
4	0.65	15	2.42	7.55	-	7.75		3	0.23	6	0.46
6	0.97	21	3.39	7.75	-	7.95		4	0.31	10	0.77
21	3.39	42	6.77	7.95	-	8.15		2	0.15	12	0.92
22	3.55	64	10.32	8.15	-	8.35		15	1.15	27	2.08
32	5.16	96	15.48	8.35	-	8.55		12	0.92	39	3.00
34	5.48	130	20.97	8.55	-	8.75		16	1.23	55	4.23
37	5.97	167	26.94	8.75	-	8.95		26	2.00	81	6.23
35	5.65	202	32.58	8.95	-	9.15		38	2.92	119	9.15
50	8.06	252	40.65	9.15	-	9.35		49	3.77	168	12.91
46	7.42	298	48.06	9.35	-	9.55		53	4.07	221	16.99
58	9.35	356	57.42	9.55	-	9.75		61	4.69	282	21.68
48	7.74	404	65.16	9.75	-	9.95		71	5.46	353	27.13
50	8.06	454	73.23	9.95	-	10.15		80	6.15	433	33.28
47	7.58	501	80.81	10.15	-	10.35		87	6.69	520	39.97
33	5.32	534	86.13	10.35	-	10.55		102	7.84	622	47.81
25	4.03	559	90.16	10.55	-	10.75		88	6.76	710	54.57
16	2.58	575	92.74	10.75	-	10.95		78	6.00	788	60.57
20	3.23	595	95.97	10.95	-	11.15		72	5.53	860	66.10
10	1.61	605	97.58	11.15	-	11.35		72	5.53	932	71.64
5	0.81	610	98.39	11.35	-	11.55		67	5.15	999	76.79
3	0.48	613	98.87	11.55	-	11.75		54	4.15	1053	80.94
3	0.48	616	99.35	11.75	-	11.95		51	3.92	1104	84.86
2	0.32	618	99.68	11.95	-	12.15		36	2.77	1140	87.62
0	0.00	618	99.68	12.15	-	12.35		45	3.46	1185	91.08
2	0.32	620	100.00	12.35	-	12.55		32	2.46	1217	93.54
				12.55	-	12.75		23	1.77	1240	95.31
				12.75	-	12.95		17	1.31	1257	96.62
				12.95	-	13.15		10	0.77	1267	97.39
				13.15	-	13.35		7	0.54	1274	97.92
				13.35	-	13.55		5	0.38	1279	98.31
				13.55	-	13.75		7	0.54	1286	98.85
				13.75	-	13.95		2	0.15	1288	99.00
				13.95	-	14.15		4	0.31	1292	99.31
				14.15	-	14.35		4	0.31	1296	99.62
				14.35	-	14.55		2	0.15	1298	99.77
				14.55	-	14.75		1	0.08	1299	99.85
				14.75	-	14.95		1	0.08	1300	99.92
				14.95	-	15.15		0	0.00	1300	99.92
				15.15	-	15.35		0	0.00	1300	99.92
				15.35	-	15.55		1	0.08	1301	100.00

(D4) ARM LENGTH

The vertical distance between the acromion right landmark and the dactylion III landmark of a participant standing erect with the arms straight at the sides is calculated as follows: ACROMIAL HEIGHT minus WRIST HEIGHT plus HAND LENGTH.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
65.00	25.59	1ST	70.40	27.72
65.58	25.82	2ND	71.60	28.19
65.99	25.98	3RD	72.30	28.46
66.60	26.22	5TH	72.90	28.70
67.70	26.65	10TH	74.11	29.17
68.50	26.97	15TH	75.10	29.57
69.10	27.20	20TH	75.80	29.84
69.70	27.44	25TH	76.30	30.04
70.30	27.68	30TH	76.90	30.28
70.70	27.83	35TH	77.40	30.47
71.10	27.99	40TH	77.90	30.67
71.50	28.15	45TH	78.40	30.87
71.90	28.31	50TH	78.80	31.02
72.40	28.50	55TH	79.30	31.22
73.00	28.74	60TH	79.80	31.42
73.50	28.94	65TH	80.37	31.64
74.10	29.17	70TH	80.70	31.77
74.48	29.32	75TH	81.58	32.12
74.80	29.45	80TH	82.20	32.36
75.69	29.79	85TH	83.00	32.68
76.70	30.20	90TH	83.90	33.03
77.90	30.67	95TH	85.80	33.78
78.57	30.94	97TH	86.60	34.09
79.50	31.30	98TH	87.40	34.41
81.25	31.99	99TH	88.30	34.76

(D4) ARM LENGTH

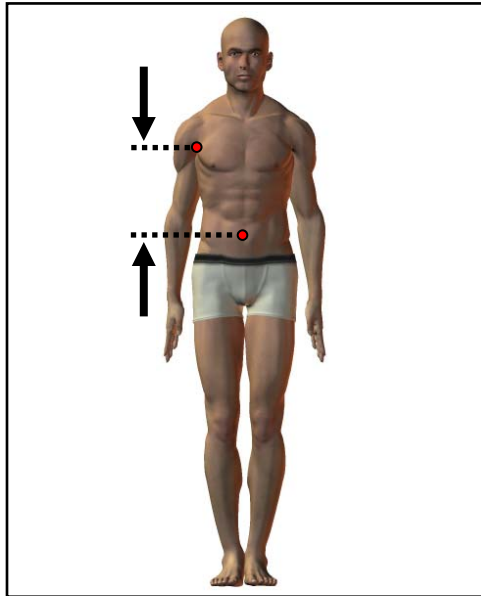
FEMALES		
CM		IN
72.13	MEAN	28.40
0.14	STD. ERROR (MEAN)	0.05
3.45	STANDARD DEVIATION	1.36
0.10	STD. ERROR (STD.DEV)	0.04
62.20	MINIMUM	24.49
82.50	MAXIMUM	32.48
SKEWNESS		0.18
KURTOSIS		2.88
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
78.99	MEAN	31.10
0.11	STD. ERROR (MEAN)	0.04
3.83	STANDARD DEVIATION	1.51
0.08	STD. ERROR (STD.DEV)	0.03
67.10	MINIMUM	26.42
92.70	MAXIMUM	36.50
SKEWNESS		0.18
KURTOSIS		3.02
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	61.55	-	62.55					
1	0.16	2	0.32	62.55	-	63.55					
1	0.16	3	0.48	63.55	-	64.55					
9	1.45	12	1.94	64.55	-	65.55					
18	2.90	30	4.84	65.55	-	66.55					
27	4.35	57	9.19	66.55	-	67.55		1	0.08	1	0.08
37	5.97	94	15.16	67.55	-	68.55		3	0.23	4	0.31
52	8.39	146	23.55	68.55	-	69.55		3	0.23	7	0.54
63	10.16	209	33.71	69.55	-	70.55		6	0.46	13	1.00
71	11.45	280	45.16	70.55	-	71.55		11	0.85	24	1.85
69	11.13	349	56.29	71.55	-	72.55		26	2.00	50	3.85
55	8.87	404	65.16	72.55	-	73.55		43	3.31	93	7.15
69	11.13	473	76.29	73.55	-	74.55		61	4.69	154	11.85
52	8.39	525	84.68	74.55	-	75.55		84	6.46	238	18.31
27	4.35	552	89.03	75.55	-	76.55		114	8.77	352	27.08
29	4.68	581	93.71	76.55	-	77.55		123	9.46	475	36.54
21	3.39	602	97.10	77.55	-	78.55		138	10.62	613	47.15
8	1.29	610	98.39	78.55	-	79.55		131	10.08	744	57.23
4	0.65	614	99.03	79.55	-	80.55		142	10.92	886	68.15
1	0.16	615	99.19	80.55	-	81.55		89	6.85	975	75.00
5	0.81	620	100.00	81.55	-	82.55		89	6.85	1064	81.85
				82.55	-	83.55		82	6.31	1146	88.15
				83.55	-	84.55		55	4.23	1201	92.38
				84.55	-	85.55		28	2.15	1229	94.54
				85.55	-	86.55		31	2.38	1260	96.92
				86.55	-	87.55		18	1.38	1278	98.31
				87.55	-	88.55		10	0.77	1288	99.08
				88.55	-	89.55		7	0.54	1295	99.62
				89.55	-	90.55		3	0.23	1298	99.85
				90.55	-	91.55		1	0.08	1299	99.92
				91.55	-	92.55		0	0.00	1299	99.92
				92.55	-	93.55		1	0.08	1300	100.00

(D5) AXILLA-WAIST LENGTH (OMPHALION)

The vertical distance between the anterior-scye-on-the-torso landmark and the anterior omphalion landmark is calculated as follows: AXILLA HEIGHT minus WAIST HEIGHT (OMPHALION).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
20.90	8.23	1ST	21.60	8.50
21.44	8.44	2ND	22.20	8.74
21.70	8.54	3RD	22.50	8.86
22.10	8.70	5TH	23.00	9.06
23.00	9.06	10TH	23.80	9.37
23.40	9.21	15TH	24.30	9.57
23.80	9.37	20TH	24.80	9.76
24.20	9.53	25TH	25.20	9.92
24.60	9.69	30TH	25.50	10.04
24.90	9.80	35TH	25.80	10.16
25.10	9.88	40TH	26.10	10.28
25.40	10.00	45TH	26.40	10.39
25.65	10.10	50TH	26.70	10.51
25.90	10.20	55TH	26.91	10.59
26.16	10.30	60TH	27.30	10.75
26.40	10.39	65TH	27.63	10.88
26.80	10.55	70TH	27.90	10.98
27.10	10.67	75TH	28.20	11.10
27.40	10.79	80TH	28.60	11.26
27.80	10.94	85TH	29.00	11.42
28.29	11.14	90TH	29.60	11.65
29.20	11.50	95TH	30.60	12.05
29.74	11.70	97TH	31.49	12.40
30.36	11.95	98TH	31.80	12.52
30.68	12.08	99TH	32.40	12.76

(D5) AXILLA-WAIST LENGTH (OMPHALION)

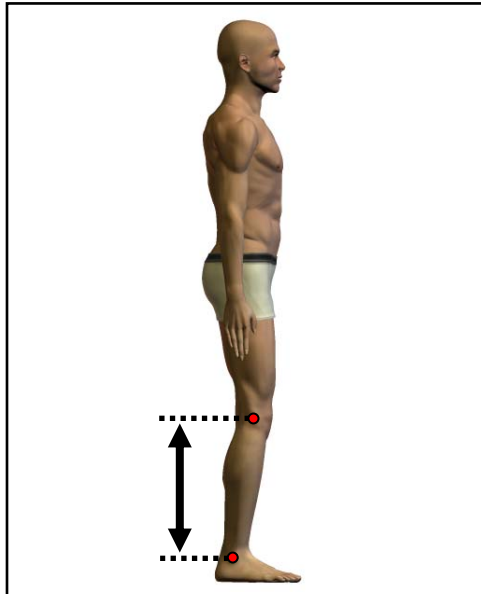
FEMALES		
<u>CM</u>		<u>IN</u>
25.64	MEAN	10.09
0.09	STD. ERROR (MEAN)	0.03
2.13	STANDARD DEVIATION	0.84
0.06	STD. ERROR (STD.DEV)	0.02
19.40	MINIMUM	7.64
32.90	MAXIMUM	12.95
SKEWNESS		0.09
KURTOSIS		3.12
COEFFICIENT OF VARIATION		8.3%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
26.73	MEAN	10.52
0.06	STD. ERROR (MEAN)	0.03
2.30	STANDARD DEVIATION	0.91
0.05	STD. ERROR (STD.DEV)	0.02
20.00	MINIMUM	7.87
34.00	MAXIMUM	13.39
SKEWNESS		0.13
KURTOSIS		2.99
COEFFICIENT OF VARIATION		8.6%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES		MALES			
F	FPct	CumF	CumFPct		CM	F	FPct	CumF	CumFPct
1	0.16	1	0.16	19.25	-	19.75			
4	0.65	5	0.81	19.75	-	20.25	2	0.15	0.15
0	0.00	5	0.81	20.25	-	20.75	2	0.15	0.31
5	0.81	10	1.61	20.75	-	21.25	4	0.31	0.61
9	1.45	19	3.06	21.25	-	21.75	6	0.46	1.08
19	3.06	38	6.13	21.75	-	22.25	13	1.00	2.08
14	2.26	52	8.39	22.25	-	22.75	23	1.77	3.84
33	5.32	85	13.71	22.75	-	23.25	33	2.54	6.38
36	5.81	121	19.52	23.25	-	23.75	42	3.23	9.61
46	7.42	167	26.94	23.75	-	24.25	61	4.69	14.30
34	5.48	201	32.42	24.25	-	24.75	66	5.07	19.37
62	10.00	263	42.42	24.75	-	25.25	86	6.61	25.98
63	10.16	326	52.58	25.25	-	25.75	100	7.69	33.67
62	10.00	388	62.58	25.75	-	26.25	115	8.84	42.51
41	6.61	429	69.19	26.25	-	26.75	114	8.76	51.27
50	8.06	479	77.26	26.75	-	27.25	106	8.15	59.42
47	7.58	526	84.84	27.25	-	27.75	99	7.61	67.03
32	5.16	558	90.00	27.75	-	28.25	106	8.15	75.17
18	2.90	576	92.90	28.25	-	28.75	88	6.76	81.94
14	2.26	590	95.16	28.75	-	29.25	77	5.92	87.86
12	1.94	602	97.10	29.25	-	29.75	37	2.84	90.70
5	0.81	607	97.90	29.75	-	30.25	28	2.15	92.85
8	1.29	615	99.19	30.25	-	30.75	36	2.77	95.62
1	0.16	616	99.35	30.75	-	31.25	15	1.15	96.77
1	0.16	617	99.52	31.25	-	31.75	13	1.00	97.77
1	0.16	618	99.68	31.75	-	32.25	12	0.92	98.69
1	0.16	619	99.84	32.25	-	32.75	9	0.69	99.39
1	0.16	620	100.00	32.75	-	33.25	5	0.38	99.77
				33.25	-	33.75	1	0.08	99.85
				33.75	-	34.25	2	0.15	100.00

(D6) CALF LINK

The vertical distance between the lateral femoral epicondyle landmark and the lateral malleolus landmark is calculated as follows: LATERAL FEMORAL EPICONDYLE HEIGHT minus LATERAL MALLEOLUS HEIGHT.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
34.72	13.67	1ST	37.40	14.72
35.40	13.94	2ND	37.80	14.88
35.66	14.05	3RD	38.21	15.04
36.00	14.17	5TH	38.80	15.28
36.50	14.37	10TH	39.40	15.51
37.02	14.58	15TH	39.93	15.72
37.40	14.72	20TH	40.30	15.87
37.73	14.85	25TH	40.70	16.02
38.20	15.04	30TH	41.10	16.18
38.40	15.12	35TH	41.40	16.30
38.70	15.24	40TH	41.80	16.46
39.00	15.35	45TH	42.00	16.54
39.30	15.47	50TH	42.30	16.65
39.60	15.59	55TH	42.51	16.73
39.90	15.71	60TH	42.90	16.89
40.30	15.87	65TH	43.30	17.05
40.60	15.98	70TH	43.70	17.20
41.00	16.14	75TH	44.00	17.32
41.38	16.29	80TH	44.50	17.52
41.80	16.46	85TH	44.90	17.68
42.40	16.69	90TH	45.60	17.95
43.40	17.09	95TH	46.69	18.39
44.00	17.32	97TH	47.10	18.54
44.52	17.53	98TH	47.60	18.74
45.22	17.80	99TH	48.20	18.98

(D6) CALF LINK

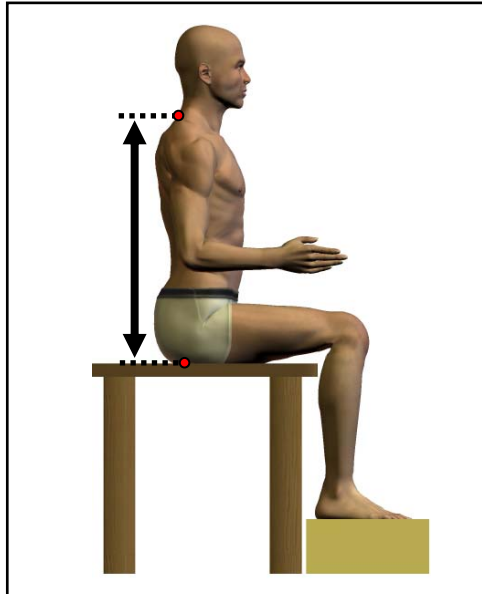
FEMALES		
<u>CM</u>		<u>IN</u>
39.44	MEAN	15.53
0.09	STD. ERROR (MEAN)	0.04
2.27	STANDARD DEVIATION	0.90
0.06	STD. ERROR (STD.DEV)	0.03
33.50	MINIMUM	13.19
47.70	MAXIMUM	18.78
SKEWNESS		0.30
KURTOSIS		2.99
COEFFICIENT OF VARIATION		5.8%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
42.43	MEAN	16.70
0.07	STD. ERROR (MEAN)	0.03
2.39	STANDARD DEVIATION	0.94
0.05	STD. ERROR (STD.DEV)	0.02
35.00	MINIMUM	13.78
50.80	MAXIMUM	20.00
SKEWNESS		0.22
KURTOSIS		2.92
COEFFICIENT OF VARIATION		5.6%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
2	0.32	2	0.32	33.25	-	33.75					
0	0.00	2	0.32	33.75	-	34.25					
4	0.65	6	0.97	34.25	-	34.75					
3	0.48	9	1.45	34.75	-	35.25	1	0.08	1	0.08	
11	1.77	20	3.23	35.25	-	35.75	0	0.00	1	0.08	
27	4.35	47	7.58	35.75	-	36.25	3	0.23	4	0.31	
26	4.19	73	11.77	36.25	-	36.75	3	0.23	7	0.54	
36	5.81	109	17.58	36.75	-	37.25	1	0.08	8	0.61	
46	7.42	155	25.00	37.25	-	37.75	16	1.23	24	1.84	
34	5.48	189	30.48	37.75	-	38.25	15	1.15	39	3.00	
62	10.00	251	40.48	38.25	-	38.75	22	1.69	61	4.69	
55	8.87	306	49.35	38.75	-	39.25	52	4.00	113	8.69	
50	8.06	356	57.42	39.25	-	39.75	49	3.77	162	12.45	
45	7.26	401	64.68	39.75	-	40.25	84	6.46	246	18.91	
41	6.61	442	71.29	40.25	-	40.75	83	6.38	329	25.29	
47	7.58	489	78.87	40.75	-	41.25	88	6.76	417	32.05	
36	5.81	525	84.68	41.25	-	41.75	101	7.76	518	39.82	
28	4.52	553	89.19	41.75	-	42.25	119	9.15	637	48.96	
19	3.06	572	92.26	42.25	-	42.75	120	9.22	757	58.19	
14	2.26	586	94.52	42.75	-	43.25	79	6.07	836	64.26	
12	1.94	598	96.45	43.25	-	43.75	94	7.23	930	71.48	
6	0.97	604	97.42	43.75	-	44.25	94	7.23	1024	78.71	
9	1.45	613	98.87	44.25	-	44.75	60	4.61	1084	83.32	
1	0.16	614	99.03	44.75	-	45.25	55	4.23	1139	87.55	
3	0.48	617	99.52	45.25	-	45.75	47	3.61	1186	91.16	
1	0.16	618	99.68	45.75	-	46.25	26	2.00	1212	93.16	
0	0.00	618	99.68	46.25	-	46.75	27	2.08	1239	95.23	
1	0.16	619	99.84	46.75	-	47.25	30	2.31	1269	97.54	
1	0.16	620	100.00	47.25	-	47.75	9	0.69	1278	98.23	
				47.75	-	48.25	12	0.92	1290	99.15	
				48.25	-	48.75	4	0.31	1294	99.46	
				48.75	-	49.25	3	0.23	1297	99.69	
				49.25	-	49.75	3	0.23	1300	99.92	
				49.75	-	50.25	0	0.00	1300	99.92	
				50.25	-	50.75	0	0.00	1300	99.92	
				50.75	-	51.25	1	0.08	1301	100.00	

(D7) CERVICALE HEIGHT, SITTING*

The vertical distance between a sitting surface and the cervicale landmark is calculated as follows: SITTING HEIGHT minus (STATURE minus CERVICALE HEIGHT).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
56.60	22.28	1ST	61.00	24.02
57.10	22.48	2ND	61.80	24.33
57.36	22.59	3RD	62.20	24.49
58.21	22.91	5TH	63.00	24.80
59.20	23.31	10TH	64.00	25.20
59.80	23.54	15TH	64.60	25.43
60.30	23.74	20TH	65.30	25.71
60.60	23.86	25TH	65.80	25.91
61.00	24.02	30TH	66.20	26.06
61.40	24.17	35TH	66.60	26.22
61.80	24.33	40TH	66.90	26.34
62.10	24.45	45TH	67.20	26.46
62.50	24.61	50TH	67.60	26.61
62.90	24.76	55TH	67.90	26.73
63.30	24.92	60TH	68.30	26.89
63.50	25.00	65TH	68.60	27.01
63.87	25.15	70TH	69.00	27.17
64.20	25.28	75TH	69.50	27.36
64.70	25.47	80TH	70.10	27.60
65.40	25.75	85TH	70.60	27.80
66.10	26.02	90TH	71.50	28.15
67.10	26.42	95TH	72.50	28.54
67.94	26.74	97TH	73.10	28.78
68.56	26.99	98TH	73.50	28.94
69.44	27.33	99TH	74.30	29.25

* In ANSUR cervicale was defined as the highest point on the seventh cervical vertebra. For consistency with international standards, it is now the most prominent point on the seventh cervical vertebra.

(D7) CERVICALE HEIGHT, SITTING

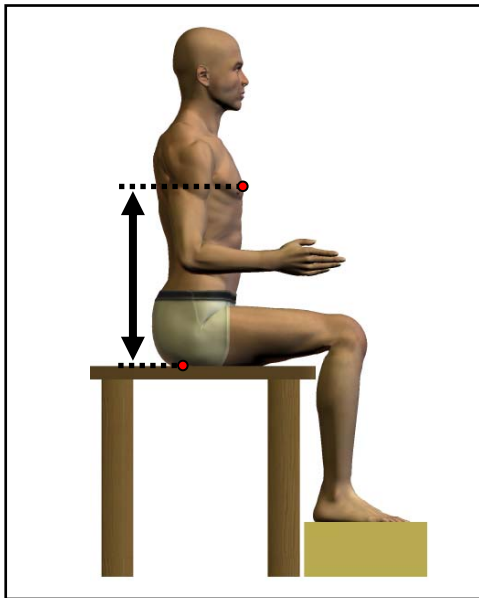
FEMALES		
<u>CM</u>		<u>IN</u>
62.54	MEAN	24.62
0.11	STD. ERROR (MEAN)	0.04
2.70	STANDARD DEVIATION	1.06
0.08	STD. ERROR (STD.DEV)	0.03
55.50	MINIMUM	21.85
70.90	MAXIMUM	27.91
SKEWNESS		0.17
KURTOSIS		-0.01
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
67.65	MEAN	26.63
0.08	STD. ERROR (MEAN)	0.03
2.87	STANDARD DEVIATION	1.13
0.06	STD. ERROR (STD.DEV)	0.02
59.20	MINIMUM	23.31
77.40	MAXIMUM	30.47
SKEWNESS		0.05
KURTOSIS		0.02
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
2	0.32	2	0.32	55.25	-	55.75					
1	0.16	3	0.48	55.75	-	56.25					
4	0.65	7	1.13	56.25	-	56.75					
8	1.29	15	2.42	56.75	-	57.25					
7	1.13	22	3.55	57.25	-	57.75					
9	1.45	31	5.00	57.75	-	58.25					
17	2.74	48	7.74	58.25	-	58.75					
19	3.06	67	10.81	58.75	-	59.25		1	0.08	1	0.08
22	3.55	89	14.35	59.25	-	59.75		5	0.38	6	0.46
33	5.32	122	19.68	59.75	-	60.25		3	0.23	9	0.69
47	7.58	169	27.26	60.25	-	60.75		3	0.23	12	0.92
36	5.81	205	33.06	60.75	-	61.25		3	0.23	15	1.15
40	6.45	245	39.52	61.25	-	61.75		9	0.69	24	1.84
49	7.90	294	47.42	61.75	-	62.25		16	1.23	40	3.07
35	5.65	329	53.06	62.25	-	62.75		16	1.23	56	4.30
39	6.29	368	59.35	62.75	-	63.25		25	1.92	81	6.23
55	8.87	423	68.23	63.25	-	63.75		35	2.69	116	8.92
43	6.94	466	75.16	63.75	-	64.25		41	3.15	157	12.07
34	5.48	500	80.65	64.25	-	64.75		51	3.92	208	15.99
21	3.39	521	84.03	64.75	-	65.25		48	3.69	256	19.68
24	3.87	545	87.90	65.25	-	65.75		57	4.38	313	24.06
23	3.71	568	91.61	65.75	-	66.25		93	7.15	406	31.21
13	2.10	581	93.71	66.25	-	66.75		81	6.23	487	37.43
13	2.10	594	95.81	66.75	-	67.25		106	8.15	593	45.58
7	1.13	601	96.94	67.25	-	67.75		80	6.15	673	51.73
5	0.81	606	97.74	67.75	-	68.25		100	7.69	773	59.42
4	0.65	610	98.39	68.25	-	68.75		88	6.76	861	66.18
4	0.65	614	99.03	68.75	-	69.25		87	6.69	948	72.87
2	0.32	616	99.35	69.25	-	69.75		52	4.00	1000	76.86
1	0.16	617	99.52	69.75	-	70.25		68	5.23	1068	82.09
1	0.16	618	99.68	70.25	-	70.75		50	3.84	1118	85.93
2	0.32	620	100.00	70.75	-	71.25		37	2.84	1155	88.78
				71.25	-	71.75		31	2.38	1186	91.16
				71.75	-	72.25		38	2.92	1224	94.08
				72.25	-	72.75		25	1.92	1249	96.00
				72.75	-	73.25		18	1.38	1267	97.39
				73.25	-	73.75		12	0.92	1279	98.31
				73.75	-	74.25		9	0.69	1288	99.00
				74.25	-	74.75		4	0.31	1292	99.31
				74.75	-	75.25		1	0.08	1293	99.39
				75.25	-	75.75		5	0.38	1298	99.77
				75.75	-	76.25		1	0.08	1299	99.85
				76.25	-	77.25		1	0.08	1300	99.92
				77.25	-	77.75		1	0.08	1301	100.00

(D8) CHEST HEIGHT, SITTING*

The vertical distance between a sitting surface and the chest point, anterior landmark is calculated as follows: SITTING HEIGHT minus (STATURE minus CHEST HEIGHT).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
34.14	13.44	1ST	39.30	15.47
35.00	13.78	2ND	40.20	15.83
35.50	13.98	3RD	40.70	16.02
36.21	14.25	5TH	41.50	16.34
37.20	14.65	10TH	42.50	16.73
38.00	14.96	15TH	42.93	16.90
38.60	15.20	20TH	43.40	17.09
39.00	15.35	25TH	43.80	17.24
39.30	15.47	30TH	44.20	17.40
39.60	15.59	35TH	44.50	17.52
39.90	15.71	40TH	44.90	17.68
40.30	15.87	45TH	45.30	17.83
40.60	15.98	50TH	45.60	17.95
40.90	16.10	55TH	46.00	18.11
41.20	16.22	60TH	46.40	18.27
41.60	16.38	65TH	46.70	18.39
41.97	16.53	70TH	47.10	18.54
42.30	16.65	75TH	47.50	18.70
42.80	16.85	80TH	48.00	18.90
43.40	17.09	85TH	48.57	19.12
44.00	17.32	90TH	49.10	19.33
44.99	17.72	95TH	50.10	19.72
45.60	17.95	97TH	50.70	19.96
47.06	18.52	98TH	51.00	20.08
47.40	18.66	99TH	52.20	20.55

* In ANSUR this measurement was taken (in males) at the level of the navel (nipple). This change was made in order to capture the breadth of the chest at its maximum. The landmark is unchanged for females. This measurement also differs from ANSUR because the tissue is now compressed and the measurement is taken at maximum inspiration.

(D8) CHEST HEIGHT, SITTING

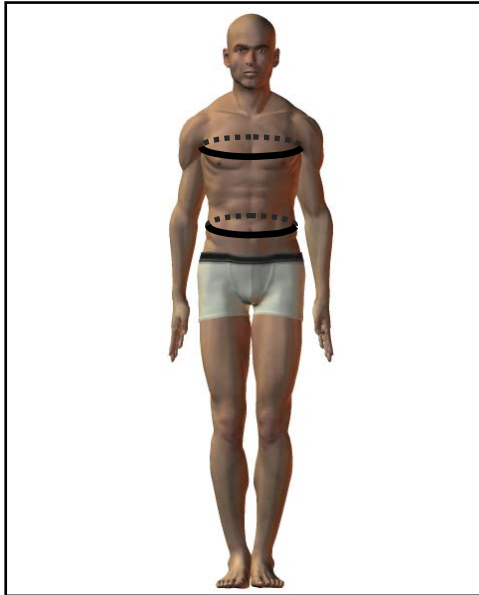
FEMALES		
CM		IN
40.63	MEAN	16.00
0.11	STD. ERROR (MEAN)	0.04
2.65	STANDARD DEVIATION	1.04
0.08	STD. ERROR (STD.DEV)	0.03
32.20	MINIMUM	12.68
47.80	MAXIMUM	18.82
SKEWNESS		0.02
KURTOSIS		3.21
COEFFICIENT OF VARIATION		6.5%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
45.68	MEAN	17.98
0.07	STD. ERROR (MEAN)	0.03
2.67	STANDARD DEVIATION	1.05
0.05	STD. ERROR (STD.DEV)	0.02
36.80	MINIMUM	14.49
54.00	MAXIMUM	21.26
SKEWNESS		0.04
KURTOSIS		3.00
COEFFICIENT OF VARIATION		5.8%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	31.75	-	32.25					
0	0.00	1	0.16	32.25	-	32.75					
1	0.16	2	0.32	32.75	-	33.25					
2	0.32	4	0.65	33.25	-	33.75					
2	0.32	6	0.97	33.75	-	34.25					
4	0.65	10	1.61	34.25	-	34.75					
4	0.65	14	2.26	34.75	-	35.25					
7	1.13	21	3.39	35.25	-	35.75					
10	1.61	31	5.00	35.75	-	36.25					
14	2.26	45	7.26	36.25	-	36.75					
18	2.90	63	10.16	36.75	-	37.25		2	0.15	2	0.15
19	3.06	82	13.23	37.25	-	37.75		0	0.00	2	0.15
28	4.52	110	17.74	37.75	-	38.25		4	0.31	6	0.46
25	4.03	135	21.77	38.25	-	38.75		3	0.23	9	0.69
46	7.42	181	29.19	38.75	-	39.25		3	0.23	12	0.92
49	7.90	230	37.10	39.25	-	39.75		4	0.31	16	1.23
48	7.74	278	44.84	39.75	-	40.25		13	1.00	29	2.23
45	7.26	323	52.10	40.25	-	40.75		12	0.92	41	3.15
50	8.06	373	60.16	40.75	-	41.25		13	1.00	54	4.15
43	6.94	416	67.10	41.25	-	41.75		22	1.69	76	5.84
43	6.94	459	74.03	41.75	-	42.25		41	3.15	117	8.99
35	5.65	494	79.68	42.25	-	42.75		50	3.84	167	12.84
25	4.03	519	83.71	42.75	-	43.25		66	5.07	233	17.91
27	4.35	546	88.06	43.25	-	43.75		82	6.30	315	24.21
28	4.52	574	92.58	43.75	-	44.25		94	7.23	409	31.44
12	1.94	586	94.52	44.25	-	44.75		85	6.53	494	37.97
9	1.45	595	95.97	44.75	-	45.25		78	6.00	572	43.97
8	1.29	603	97.26	45.25	-	45.75		102	7.84	674	51.81
2	0.32	605	97.58	45.75	-	46.25		88	6.76	762	58.57
1	0.16	606	97.74	46.25	-	46.75		100	7.69	862	66.26
4	0.65	610	98.39	46.75	-	47.25		75	5.76	937	72.02
9	1.45	619	99.84	47.25	-	47.75		84	6.46	1021	78.48
1	0.16	620	100.00	47.75	-	48.25		48	3.69	1069	82.17
				48.25	-	48.75		57	4.38	1126	86.55
				48.75	-	49.25		51	3.92	1177	90.47
				49.25	-	49.75		46	3.54	1223	94.00
				49.75	-	50.25		19	1.46	1242	95.47
				50.25	-	50.75		22	1.69	1264	97.16
				50.75	-	51.25		17	1.31	1281	98.46
				51.25	-	51.75		4	0.31	1285	98.77
				51.75	-	52.25		5	0.38	1290	99.15
				52.25	-	52.75		4	0.31	1294	99.46
				52.75	-	53.25		3	0.23	1297	99.69
				53.25	-	53.75		2	0.15	1299	99.85
				53.75	-	54.25		2	0.15	1301	100.00

(D9) CHEST-WAIST DROP (OMPHALION)*

The difference between the circumference of the chest and the circumference of the waist at omphalion is calculated as follows: CHEST CIRCUMFERENCE minus WAIST CIRCUMFERENCE (OMPHALION).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
-3.36	-1.32	1ST	2.70	1.06
-2.52	-0.99	2ND	4.11	1.61
-0.80	-0.31	3RD	5.11	2.01
0.61	0.24	5TH	6.60	2.60
3.11	1.22	10TH	8.50	3.35
4.42	1.74	15TH	9.73	3.83
5.30	2.09	20TH	10.60	4.17
6.20	2.44	25TH	11.45	4.51
7.00	2.76	30TH	12.16	4.78
7.70	3.03	35TH	12.80	5.04
8.40	3.31	40TH	13.50	5.31
9.10	3.58	45TH	14.10	5.55
9.80	3.86	50TH	14.60	5.75
10.40	4.09	55TH	15.30	6.02
10.80	4.25	60TH	15.90	6.26
11.47	4.52	65TH	16.40	6.46
12.10	4.76	70TH	17.10	6.73
12.90	5.08	75TH	17.80	7.01
13.88	5.46	80TH	18.60	7.32
15.10	5.94	85TH	19.60	7.72
16.00	6.30	90TH	20.60	8.11
17.80	7.01	95TH	22.69	8.94
19.20	7.56	97TH	23.80	9.37
19.80	7.80	98TH	24.60	9.69
20.91	8.23	99TH	26.49	10.43

* In ANSUR this measurement was taken (in males) at the level of thelion (nipple). This change was made in order to capture the breadth of the chest at its maximum. The landmark is unchanged for females.

(D9) CHEST-WAIST DROP (OMPHALION)

FEMALES		
CM		IN
9.57	MEAN	3.77
0.21	STD. ERROR (MEAN)	0.08
5.19	STANDARD DEVIATION	2.04
0.15	STD. ERROR (STD.DEV)	0.06
-6.40	MINIMUM	-2.52
29.50	MAXIMUM	11.61
SKEWNESS		-0.06
KURTOSIS		3.32
COEFFICIENT OF VARIATION		54.2%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
14.62	MEAN	5.76
0.14	STD. ERROR (MEAN)	0.05
4.91	STANDARD DEVIATION	1.93
0.10	STD. ERROR (STD.DEV)	0.04
-6.70	MINIMUM	-2.64
32.30	MAXIMUM	12.72
SKEWNESS		-0.04
KURTOSIS		3.49
COEFFICIENT OF VARIATION		33.6%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	-7.45	-	-6.45		1	0.08	1	0.08
3	0.48	4	0.65	-6.45	-	-5.45		0	0.00	1	0.08
1	0.16	5	0.81	-5.45	-	-4.45		0	0.00	1	0.08
7	1.13	12	1.94	-4.45	-	-3.45		0	0.00	1	0.08
4	0.65	16	2.58	-3.45	-	-2.45		0	0.00	1	0.08
6	0.97	22	3.55	-2.45	-	-1.45		0	0.00	1	0.08
7	1.13	29	4.68	-1.45	-	-0.45		1	0.08	2	0.15
12	1.94	41	6.61	-0.45	-	0.55		4	0.31	6	0.46
10	1.61	51	8.23	0.55	-	1.55		2	0.15	8	0.61
19	3.06	70	11.29	1.55	-	2.55		3	0.23	11	0.85
26	4.19	96	15.48	2.55	-	3.55		9	0.69	20	1.54
38	6.13	134	21.61	3.55	-	4.55		9	0.69	29	2.23
36	5.81	170	27.42	4.55	-	5.55		20	1.54	49	3.77
37	5.97	207	33.39	5.55	-	6.55		15	1.15	64	4.92
49	7.90	256	41.29	6.55	-	7.55		26	2.00	90	6.92
48	7.74	304	49.03	7.55	-	8.55		47	3.61	137	10.53
52	8.39	356	57.42	8.55	-	9.55		42	3.23	179	13.76
54	8.71	410	66.13	9.55	-	10.55		75	5.76	254	19.52
40	6.45	450	72.58	10.55	-	11.55		76	5.84	330	25.37
38	6.13	488	78.71	11.55	-	12.55		99	7.61	429	32.97
26	4.19	514	82.90	12.55	-	13.55		102	7.84	531	40.81
28	4.52	542	87.42	13.55	-	14.55		111	8.53	642	49.35
28	4.52	570	91.94	14.55	-	15.55		105	8.07	747	57.42
14	2.26	584	94.19	15.55	-	16.55		113	8.69	860	66.10
8	1.29	592	95.48	16.55	-	17.55		92	7.07	952	73.17
13	2.10	605	97.58	17.55	-	18.55		83	6.38	1035	79.55
9	1.45	614	99.03	18.55	-	19.55		64	4.92	1099	84.47
1	0.16	615	99.19	19.55	-	20.55		68	5.23	1167	89.70
2	0.32	617	99.52	20.55	-	21.55		36	2.77	1203	92.47
0	0.00	617	99.52	21.55	-	22.55		32	2.46	1235	94.93
1	0.16	618	99.68	22.55	-	23.55		23	1.77	1258	96.69
0	0.00	618	99.68	23.55	-	24.55		17	1.31	1275	98.00
1	0.16	619	99.84	24.55	-	25.55		10	0.77	1285	98.77
0	0.00	619	99.84	25.55	-	26.55		4	0.31	1289	99.08
0	0.00	619	99.84	26.55	-	27.55		3	0.23	1292	99.31
1	0.16	620	100.00	27.55	-	28.55		4	0.31	1296	99.62
				28.55	-	29.55		1	0.08	1297	99.69
				29.55	-	30.55		0	0.00	1297	99.69
				30.55	-	31.55		2	0.15	1299	99.85
				31.55	-	32.55		2	0.15	1301	100.00

(D10) CLAVICLE LINK

The distance between the midline of the body and the acromion right landmark is calculated as one-half of BIACROMIAL BREADTH.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
16.00	6.30	1ST	18.10	7.13
16.30	6.42	2ND	18.40	7.24
16.40	6.46	3RD	18.60	7.32
16.50	6.50	5TH	18.80	7.40
16.90	6.65	10TH	19.20	7.56
17.10	6.73	15TH	19.50	7.68
17.30	6.81	20TH	19.60	7.72
17.40	6.85	25TH	19.80	7.80
17.50	6.89	30TH	19.90	7.83
17.70	6.97	35TH	20.10	7.91
17.80	7.01	40TH	20.20	7.95
17.90	7.05	45TH	20.30	7.99
18.00	7.09	50TH	20.45	8.05
18.10	7.13	55TH	20.60	8.11
18.14	7.15	60TH	20.70	8.15
18.20	7.17	65TH	20.80	8.19
18.30	7.20	70TH	21.00	8.27
18.50	7.28	75TH	21.10	8.31
18.60	7.32	80TH	21.30	8.39
18.80	7.40	85TH	21.50	8.46
19.00	7.48	90TH	21.70	8.54
19.30	7.60	95TH	22.10	8.70
19.50	7.68	97TH	22.40	8.82
19.66	7.74	98TH	22.50	8.86
19.90	7.83	99TH	22.70	8.94

(D10) CLAVICLE LINK

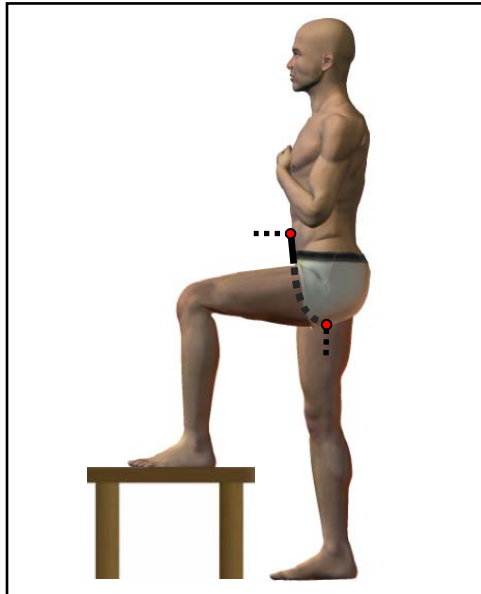
FEMALES		
<u>CM</u>		<u>IN</u>
17.95	MEAN	7.07
0.03	STD. ERROR (MEAN)	0.01
0.81	STANDARD DEVIATION	0.32
0.02	STD. ERROR (STD.DEV)	0.01
15.00	MINIMUM	5.91
20.20	MAXIMUM	7.95
SKEWNESS		-0.05
KURTOSIS		3.03
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		618

MALES		
<u>CM</u>		<u>IN</u>
20.46	MEAN	8.06
0.03	STD. ERROR (MEAN)	0.01
0.98	STANDARD DEVIATION	0.39
0.02	STD. ERROR (STD.DEV)	0.01
17.70	MINIMUM	6.97
23.40	MAXIMUM	9.21
SKEWNESS		-0.01
KURTOSIS		2.91
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	14.95	-	15.15					
0	0.00	1	0.16	15.15	-	15.35					
0	0.00	1	0.16	15.35	-	15.55					
1	0.16	2	0.32	15.55	-	15.75					
3	0.49	5	0.81	15.75	-	15.95					
5	0.81	10	1.62	15.95	-	16.15					
3	0.49	13	2.10	16.15	-	16.35					
19	3.07	32	5.18	16.35	-	16.55					
12	1.94	44	7.12	16.55	-	16.75					
18	2.91	62	10.03	16.75	-	16.95					
39	6.31	101	16.34	16.95	-	17.15					
47	7.61	148	23.95	17.15	-	17.35					
47	7.61	195	31.55	17.35	-	17.55					
36	5.83	231	37.38	17.55	-	17.75		3	0.23	3	0.23
70	11.33	301	48.71	17.75	-	17.95		5	0.38	8	0.62
70	11.33	371	60.03	17.95	-	18.15		6	0.46	14	1.08
64	10.36	435	70.39	18.15	-	18.35		10	0.77	24	1.85
54	8.74	489	79.13	18.35	-	18.55		14	1.08	38	2.92
27	4.37	516	83.50	18.55	-	18.75		14	1.08	52	4.00
33	5.34	549	88.83	18.75	-	18.95		37	2.85	89	6.85
20	3.24	569	92.07	18.95	-	19.15		27	2.08	116	8.92
21	3.40	590	95.47	19.15	-	19.35		48	3.69	164	12.62
13	2.10	603	97.57	19.35	-	19.55		62	4.77	226	17.38
6	0.97	609	98.54	19.55	-	19.75		77	5.92	303	23.31
5	0.81	614	99.35	19.75	-	19.95		88	6.77	391	30.08
3	0.49	617	99.84	19.95	-	20.15		97	7.46	488	37.54
1	0.16	618	100.00	20.15	-	20.35		100	7.69	588	45.23
				20.35	-	20.55		106	8.15	694	53.38
				20.55	-	20.75		98	7.54	792	60.92
				20.75	-	20.95		109	8.38	901	69.31
				20.95	-	21.15		84	6.46	985	75.77
				21.15	-	21.35		77	5.92	1062	81.69
				21.35	-	21.55		63	4.85	1125	86.54
				21.55	-	21.75		48	3.69	1173	90.23
				21.75	-	21.95		38	2.92	1211	93.15
				21.95	-	22.15		30	2.31	1241	95.46
				22.15	-	22.35		19	1.46	1260	96.92
				22.35	-	22.55		19	1.46	1279	98.38
				22.55	-	22.75		10	0.77	1289	99.15
				22.75	-	22.95		5	0.38	1294	99.54
				22.95	-	23.15		2	0.15	1296	99.69
				23.15	-	23.35		2	0.15	1298	99.85
				23.35	-	23.55		2	0.15	1300	100.00

(D11) CROTCH LENGTH, ANTERIOR (OMPHALION)

The surface distance between the inner thigh landmark and the abdomen at the level of the waist at the navel (omphalion) of a participant standing with one leg on a step is calculated as follows: CROTCH LENGTH (OMPHALION) minus CROTCH LENGTH POSTERIOR (OMPHALION).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
20.08	7.90	1ST	22.00	8.66
20.90	8.23	2ND	22.50	8.86
21.26	8.38	3RD	22.90	9.02
21.70	8.54	5TH	23.60	9.29
22.50	8.86	10TH	24.50	9.65
23.22	9.14	15TH	25.30	9.96
23.90	9.41	20TH	25.90	10.20
24.30	9.57	25TH	26.50	10.43
24.70	9.72	30TH	27.00	10.63
25.10	9.88	35TH	27.30	10.75
25.50	10.04	40TH	27.80	10.94
25.80	10.16	45TH	28.10	11.06
26.05	10.26	50TH	28.50	11.22
26.40	10.39	55TH	28.90	11.38
26.70	10.51	60TH	29.30	11.54
27.20	10.71	65TH	29.70	11.69
27.60	10.87	70TH	30.10	11.85
28.00	11.02	75TH	30.50	12.01
28.60	11.26	80TH	30.98	12.19
29.00	11.42	85TH	31.70	12.48
29.60	11.65	90TH	32.59	12.83
30.90	12.17	95TH	33.80	13.31
31.80	12.52	97TH	34.49	13.58
32.30	12.72	98TH	35.00	13.78
32.78	12.90	99TH	36.80	14.49

(D11) CROTCH LENGTH, ANTERIOR (OMPHALION)

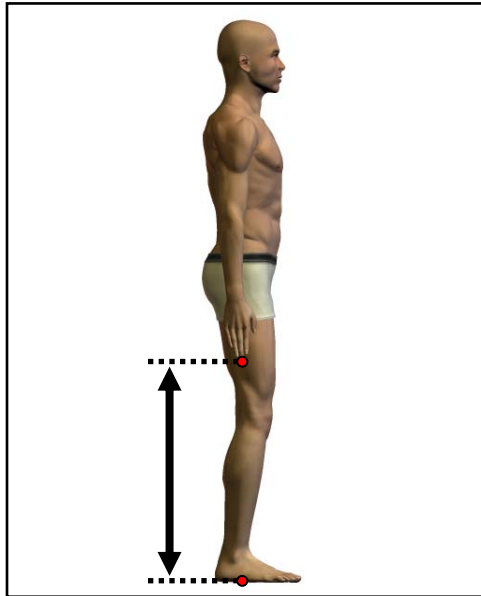
FEMALES		
CM		IN
26.17	MEAN	10.31
0.11	STD. ERROR (MEAN)	0.01
2.79	STANDARD DEVIATION	0.24
0.08	STD. ERROR (STD.DEV)	0.01
18.10	MINIMUM	7.13
37.90	MAXIMUM	14.92
SKEWNESS		0.24
KURTOSIS		3.27
COEFFICIENT OF VARIATION		10.7%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
28.55	MEAN	11.24
0.09	STD. ERROR (MEAN)	0.03
3.08	STANDARD DEVIATION	1.21
0.06	STD. ERROR (STD.DEV)	0.02
19.90	MINIMUM	7.83
39.80	MAXIMUM	15.67
SKEWNESS		0.20
KURTOSIS		3.11
COEFFICIENT OF VARIATION		10.8%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	17.75	-	18.25					
0	0.00	1	0.16	18.25	-	18.75					
1	0.16	2	0.32	18.75	-	19.25					
1	0.16	3	0.48	19.25	-	19.75					
3	0.48	6	0.97	19.75	-	20.25		1	0.08	1	0.08
3	0.48	9	1.45	20.25	-	20.75		2	0.15	3	0.23
9	1.45	18	2.90	20.75	-	21.25		1	0.08	4	0.31
14	2.26	32	5.16	21.25	-	21.75		5	0.38	9	0.69
24	3.87	56	9.03	21.75	-	22.25		6	0.46	15	1.15
9	1.45	65	10.48	22.25	-	22.75		19	1.46	34	2.62
28	4.52	93	15.00	22.75	-	23.25		22	1.69	56	4.31
22	3.55	115	18.55	23.25	-	23.75		20	1.54	76	5.85
37	5.97	152	24.52	23.75	-	24.25		36	2.77	112	8.62
42	6.77	194	31.29	24.25	-	24.75		36	2.77	148	11.38
38	6.13	232	37.42	24.75	-	25.25		46	3.54	194	14.92
43	6.94	275	44.35	25.25	-	25.75		50	3.85	244	18.77
57	9.19	332	53.55	25.75	-	26.25		59	4.54	303	23.31
44	7.10	376	60.65	26.25	-	26.75		53	4.08	356	27.38
32	5.16	408	65.81	26.75	-	27.25		88	6.77	444	34.15
38	6.13	446	71.94	27.25	-	27.75		65	5.00	509	39.15
33	5.32	479	77.26	27.75	-	28.25		98	7.54	607	46.69
29	4.68	508	81.94	28.25	-	28.75		87	6.69	694	53.38
35	5.65	543	87.58	28.75	-	29.25		74	5.69	768	59.08
18	2.90	561	90.48	29.25	-	29.75		86	6.62	854	65.69
15	2.42	576	92.90	29.75	-	30.25		77	5.92	931	71.62
11	1.77	587	94.68	30.25	-	30.75		79	6.08	1010	77.69
7	1.13	594	95.81	30.75	-	31.25		63	4.85	1073	82.54
6	0.97	600	96.77	31.25	-	31.75		35	2.69	1108	85.23
6	0.97	606	97.74	31.75	-	32.25		40	3.08	1148	88.31
8	1.29	614	99.03	32.25	-	32.75		34	2.62	1182	90.92
2	0.32	616	99.35	32.75	-	33.25		34	2.62	1216	93.54
0	0.00	616	99.35	33.25	-	33.75		16	1.23	1232	94.77
1	0.16	617	99.52	33.75	-	34.25		27	2.08	1259	96.85
1	0.16	618	99.68	34.25	-	34.75		11	0.85	1270	97.69
1	0.16	619	99.84	34.75	-	35.25		9	0.69	1279	98.38
0	0.00	619	99.84	35.25	-	35.75		4	0.31	1283	98.69
0	0.00	619	99.84	35.75	-	36.25		2	0.15	1285	98.85
0	0.00	619	99.84	36.25	-	36.75		1	0.08	1286	98.92
0	0.00	619	99.84	36.75	-	37.25		4	0.31	1290	99.23
0	0.00	619	99.84	37.25	-	37.75		5	0.38	1295	99.62
1	0.16	620	100.00	37.75	-	38.25		2	0.15	1297	99.77
				38.25	-	38.75		0	0.00	1297	99.77
				38.75	-	39.25		1	0.08	1298	99.85
				39.25	-	39.75		1	0.08	1299	99.92
				39.75	-	40.25		1	0.08	1300	100.00

(D12) DACTYLION HEIGHT

The vertical distance between a standing surface and the dactylon III landmark of a participant standing erect with the arms and hands straight at the sides is calculated as follows: WRIST HEIGHT minus HAND LENGTH.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
53.96	21.25	1ST	56.00	22.05
54.84	21.59	2ND	57.00	22.44
55.33	21.78	3RD	57.80	22.76
55.70	21.93	5TH	58.41	22.99
56.70	22.32	10TH	59.60	23.46
57.60	22.68	15TH	60.50	23.82
58.10	22.87	20TH	61.22	24.10
58.50	23.03	25TH	61.80	24.33
58.90	23.19	30TH	62.43	24.58
59.30	23.35	35TH	62.84	24.73
59.80	23.54	40TH	63.30	24.92
60.45	23.80	45TH	63.70	25.08
61.00	24.02	50TH	64.10	25.24
61.30	24.13	55TH	64.70	25.47
61.70	24.29	60TH	65.20	25.67
62.10	24.45	65TH	65.80	25.91
62.70	24.69	70TH	66.20	26.06
63.38	24.95	75TH	66.90	26.34
63.80	25.12	80TH	67.40	26.54
64.60	25.43	85TH	68.10	26.81
65.60	25.83	90TH	69.30	27.28
67.10	26.42	95TH	70.90	27.91
67.84	26.70	97TH	71.70	28.23
68.20	26.85	98TH	72.50	28.54
69.20	27.24	99TH	73.70	29.02

(D12) DACTYLION HEIGHT

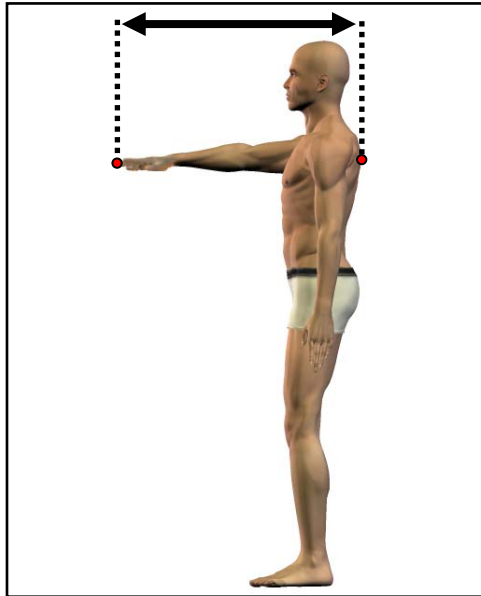
FEMALES		
<u>CM</u>		<u>IN</u>
61.00	MEAN	24.01
0.13	STD. ERROR (MEAN)	0.05
3.36	STANDARD DEVIATION	1.32
0.10	STD. ERROR (STD.DEV)	0.04
52.00	MINIMUM	20.47
70.30	MAXIMUM	27.68
SKEWNESS		0.23
KURTOSIS		2.66
COEFFICIENT OF VARIATION		5.5%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
64.37	MEAN	25.34
0.10	STD. ERROR (MEAN)	0.04
3.76	STANDARD DEVIATION	1.48
0.07	STD. ERROR (STD.DEV)	0.03
53.10	MINIMUM	20.91
77.90	MAXIMUM	30.67
SKEWNESS		0.23
KURTOSIS		3.12
COEFFICIENT OF VARIATION		5.8%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	51.55	-	52.55		2	0.15	2	0.15
2	0.32	3	0.48	52.55	-	53.55		0	0.00	2	0.15
8	1.29	11	1.77	53.55	-	54.55		4	0.31	6	0.46
13	2.10	24	3.87	54.55	-	55.55		12	0.92	18	1.38
31	5.00	55	8.87	55.55	-	56.55		17	1.31	35	2.69
37	5.97	92	14.84	56.55	-	57.55		31	2.38	66	5.08
65	10.48	157	25.32	57.55	-	58.55		59	4.54	125	9.62
74	11.94	231	37.26	58.55	-	59.55		74	5.69	199	15.31
52	8.39	283	45.65	59.55	-	60.55		96	7.38	295	22.69
78	12.58	361	58.23	60.55	-	61.55		108	8.31	403	31.00
66	10.65	427	68.87	61.55	-	62.55		169	13.00	572	44.00
54	8.71	481	77.58	62.55	-	63.55		135	10.38	707	54.38
43	6.94	524	84.52	63.55	-	64.55		112	8.62	819	63.00
31	5.00	555	89.52	64.55	-	65.55		129	9.92	948	72.92
27	4.35	582	93.87	65.55	-	66.55		106	8.15	1054	81.08
16	2.58	598	96.45	66.55	-	67.55		85	6.54	1139	87.62
12	1.94	610	98.39	67.55	-	68.55		40	3.08	1179	90.69
8	1.29	618	99.68	68.55	-	69.55		44	3.38	1223	94.08
2	0.32	620	100.00	69.55	-	70.55		35	2.69	1258	96.77
				70.55	-	71.55		18	1.38	1276	98.15
				71.55	-	72.55		10	0.77	1286	98.92
				72.55	-	73.55		4	0.31	1290	99.23
				73.55	-	74.55		5	0.38	1295	99.62
				74.55	-	75.55		3	0.23	1298	99.85
				75.55	-	76.55		1	0.08	1299	99.92
				76.55	-	77.55		1	0.08	1300	100.00
				77.55	-	78.55					

(D13) DACTYLION REACH FROM WALL

The horizontal distance between the plane of the back and the dactylon III landmark of a participant standing erect with the back against a wall and the arm, hand, and fingers extended forward horizontally is calculated as follows: THUMB TIP REACH plus (ANSUR mean of HAND LENGTH minus ANSUR mean of WRIST-THUMB TIP LENGTH).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
72.32	28.47	1ST	78.20	30.79
73.24	28.84	2ND	78.80	31.02
73.70	29.02	3RD	79.40	31.26
74.30	29.25	5TH	80.00	31.50
75.30	29.65	10TH	81.50	32.09
76.20	30.00	15TH	82.50	32.48
76.70	30.20	20TH	83.20	32.76
77.20	30.39	25TH	83.80	32.99
77.80	30.63	30TH	84.20	33.15
78.30	30.83	35TH	84.80	33.39
78.80	31.02	40TH	85.20	33.54
79.10	31.14	45TH	85.60	33.70
79.50	31.30	50TH	85.90	33.82
80.00	31.50	55TH	86.50	34.06
80.30	31.61	60TH	87.00	34.25
80.90	31.85	65TH	87.60	34.49
81.40	32.05	70TH	88.30	34.76
81.90	32.24	75TH	88.80	34.96
82.60	32.52	80TH	89.60	35.28
83.20	32.76	85TH	90.59	35.66
83.90	33.03	90TH	91.49	36.02
85.20	33.54	95TH	93.30	36.73
85.84	33.80	97TH	94.00	37.01
86.26	33.96	98TH	94.80	37.32
88.20	34.72	99TH	96.30	37.91

(D13) DACTYLION REACH FROM WALL

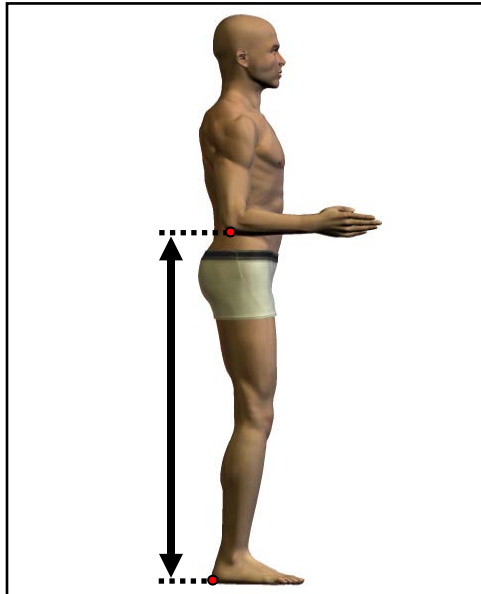
FEMALES		
CM		IN
79.62	MEAN	31.35
0.13	STD. ERROR (MEAN)	0.05
3.31	STANDARD DEVIATION	1.30
0.09	STD. ERROR (STD.DEV)	0.04
70.60	MINIMUM	27.80
90.20	MAXIMUM	35.51
SKEWNESS		0.14
KURTOSIS		2.84
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		619

MALES		
CM		IN
86.34	MEAN	33.99
0.11	STD. ERROR (MEAN)	0.04
3.90	STANDARD DEVIATION	1.54
0.08	STD. ERROR (STD.DEV)	0.03
75.10	MINIMUM	29.57
99.50	MAXIMUM	39.17
SKEWNESS		0.26
KURTOSIS		3.06
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
3	0.48	3	0.48	70.55	-	71.55					
5	0.81	8	1.29	71.55	-	72.55					
7	1.13	15	2.42	72.55	-	73.55					
23	3.72	38	6.14	73.55	-	74.55					
30	4.85	68	10.99	74.55	-	75.55		1	0.08	1	0.08
48	7.75	116	18.74	75.55	-	76.55		2	0.15	3	0.23
53	8.56	169	27.30	76.55	-	77.55		8	0.62	11	0.85
54	8.72	223	36.03	77.55	-	78.55		6	0.46	17	1.31
93	15.02	316	51.05	78.55	-	79.55		30	2.31	47	3.62
67	10.82	383	61.87	79.55	-	80.55		34	2.62	81	6.23
64	10.34	447	72.21	80.55	-	81.55		54	4.15	135	10.38
48	7.75	495	79.97	81.55	-	82.55		66	5.08	201	15.46
54	8.72	549	88.69	82.55	-	83.55		94	7.23	295	22.69
23	3.72	572	92.41	83.55	-	84.55		131	10.08	426	32.77
22	3.55	594	95.96	84.55	-	85.55		150	11.54	576	44.31
15	2.42	609	98.38	85.55	-	86.55		148	11.38	724	55.69
2	0.32	611	98.71	86.55	-	87.55		113	8.69	837	64.38
4	0.65	615	99.35	87.55	-	88.55		106	8.15	943	72.54
3	0.48	618	99.84	88.55	-	89.55		95	7.31	1038	79.85
1	0.16	619	100.00	89.55	-	90.55		67	5.15	1105	85.00
				90.55	-	91.55		70	5.38	1175	90.38
				91.55	-	92.55		37	2.85	1212	93.23
				92.55	-	93.55		32	2.46	1244	95.69
				93.55	-	94.55		24	1.85	1268	97.54
				94.55	-	95.55		14	1.08	1282	98.62
				95.55	-	96.55		6	0.46	1288	99.08
				96.55	-	97.55		6	0.46	1294	99.54
				97.55	-	98.55		3	0.23	1297	99.77
				98.55	-	99.55		3	0.23	1300	100.00

(D14) ELBOW REST HEIGHT, STANDING

The vertical distance between a standing surface and the olecranon bottom landmark of a participant standing erect with the forearm and hand held horizontally is calculated as follows: ELBOW REST HEIGHT plus STATURE minus SITTING HEIGHT.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
89.47	35.23	1ST	96.81	38.11
91.38	35.97	2ND	97.90	38.54
92.10	36.26	3RD	98.71	38.86
92.80	36.54	5TH	99.60	39.21
94.10	37.05	10TH	101.30	39.88
95.22	37.49	15TH	102.53	40.36
96.02	37.81	20TH	103.40	40.71
96.80	38.11	25TH	104.30	41.06
97.50	38.39	30TH	105.00	41.34
98.20	38.66	35TH	105.57	41.56
98.70	38.86	40TH	106.20	41.81
99.10	39.02	45TH	106.90	42.09
99.80	39.29	50TH	107.50	42.32
100.30	39.49	55TH	108.20	42.60
100.70	39.65	60TH	108.80	42.83
101.30	39.88	65TH	109.30	43.03
101.97	40.15	70TH	110.20	43.39
102.70	40.43	75TH	111.00	43.70
103.30	40.67	80TH	111.86	44.04
104.30	41.06	85TH	113.07	44.52
105.70	41.61	90TH	114.50	45.08
106.90	42.09	95TH	116.59	45.91
108.47	42.71	97TH	118.00	46.46
109.16	42.97	98TH	118.60	46.69
110.26	43.41	99TH	120.89	47.60

(D14) ELBOW REST HEIGHT, STANDING

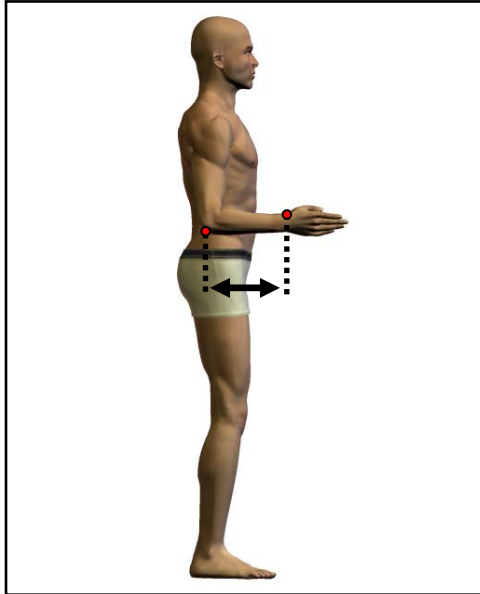
FEMALES		
CM		IN
99.80	MEAN	39.29
0.17	STD. ERROR (MEAN)	0.07
4.34	STANDARD DEVIATION	1.71
0.12	STD. ERROR (STD.DEV)	0.05
87.80	MINIMUM	34.57
112.70	MAXIMUM	44.37
SKEWNESS		0.12
KURTOSIS		2.87
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
107.73	MEAN	42.41
0.14	STD. ERROR (MEAN)	0.06
5.08	STANDARD DEVIATION	2.00
0.10	STD. ERROR (STD.DEV)	0.04
93.00	MINIMUM	36.61
123.70	MAXIMUM	48.70
SKEWNESS		0.24
KURTOSIS		2.92
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM		CM		E	FPct	CumF	CumFPct
2	0.32	2	0.32	87.55	-	88.55					
4	0.65	6	0.97	88.55	-	89.55					
2	0.32	8	1.29	89.55	-	90.55					
5	0.81	13	2.10	90.55	-	91.55					
11	1.77	24	3.87	91.55	-	92.55					
22	3.55	46	7.42	92.55	-	93.55		1	0.08	1	0.08
33	5.32	79	12.74	93.55	-	94.55		1	0.08	2	0.15
23	3.71	102	16.45	94.55	-	95.55		2	0.15	4	0.31
45	7.26	147	23.71	95.55	-	96.55		5	0.38	9	0.69
42	6.77	189	30.48	96.55	-	97.55		10	0.77	19	1.46
44	7.10	233	37.58	97.55	-	98.55		15	1.15	34	2.61
64	10.32	297	47.90	98.55	-	99.55		30	2.31	64	4.92
68	10.97	365	58.87	99.55	-	100.55		34	2.61	98	7.53
49	7.90	414	66.77	100.55	-	101.55		45	3.46	143	10.99
43	6.94	457	73.71	101.55	-	102.55		52	4.00	195	14.99
45	7.26	502	80.97	102.55	-	103.55		75	5.76	270	20.75
30	4.84	532	85.81	103.55	-	104.55		84	6.46	354	27.21
21	3.39	553	89.19	104.55	-	105.55		101	7.76	455	34.97
30	4.84	583	94.03	105.55	-	106.55		95	7.30	550	42.28
11	1.77	594	95.81	106.55	-	107.55		106	8.15	656	50.42
8	1.29	602	97.10	107.55	-	108.55		104	7.99	760	58.42
8	1.29	610	98.39	108.55	-	109.55		105	8.07	865	66.49
6	0.97	616	99.35	109.55	-	110.55		74	5.69	939	72.18
1	0.16	617	99.52	110.55	-	111.55		80	6.15	1019	78.32
2	0.32	619	99.84	111.55	-	112.55		60	4.61	1079	82.94
1	0.16	620	100.00	112.55	-	113.55		51	3.92	1130	86.86
				113.55	-	114.55		43	3.31	1173	90.16
				114.55	-	115.55		30	2.31	1203	92.47
				115.55	-	116.55		33	2.54	1236	95.00
				116.55	-	117.55		18	1.38	1254	96.39
				117.55	-	118.55		20	1.54	1274	97.92
				118.55	-	119.55		7	0.54	1281	98.46
				119.55	-	120.55		7	0.54	1288	99.00
				120.55	-	121.55		5	0.38	1293	99.39
				121.55	-	122.55		6	0.46	1299	99.85
				122.55	-	123.55		1	0.08	1300	99.92
				123.55	-	124.55		1	0.08	1301	100.00

(D15) ELBOW-WRIST LENGTH

The horizontal distance between the olecranon rear landmark and the stylium landmark of a participant standing with the forearm and hand held horizontally is calculated as follows: FOREARM-HAND LENGTH minus HAND LENGTH.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
22.82	8.99	1ST	25.10	9.88
23.20	9.13	2ND	25.40	10.00
23.40	9.21	3RD	25.70	10.12
23.60	9.29	5TH	26.00	10.24
23.90	9.41	10TH	26.40	10.39
24.10	9.49	15TH	26.70	10.51
24.30	9.57	20TH	27.00	10.63
24.50	9.65	25TH	27.20	10.71
24.70	9.72	30TH	27.50	10.83
24.80	9.76	35TH	27.70	10.91
25.00	9.84	40TH	27.90	10.98
25.30	9.96	45TH	28.00	11.02
25.50	10.04	50TH	28.20	11.10
25.70	10.12	55TH	28.40	11.18
25.90	10.20	60TH	28.70	11.30
26.10	10.28	65TH	28.90	11.38
26.20	10.31	70TH	29.10	11.46
26.40	10.39	75TH	29.30	11.54
26.78	10.54	80TH	29.60	11.65
27.00	10.63	85TH	29.90	11.77
27.40	10.79	90TH	30.30	11.93
28.00	11.02	95TH	30.99	12.20
28.20	11.10	97TH	31.40	12.36
28.40	11.18	98TH	31.60	12.44
28.98	11.41	99TH	31.90	12.56

(D15) ELBOW-WRIST LENGTH

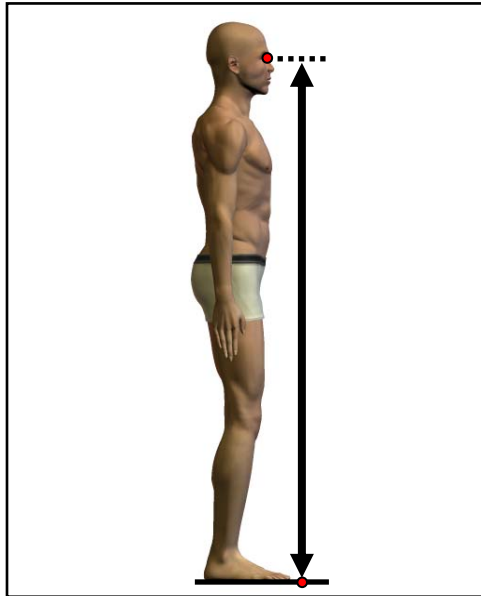
FEMALES		
<u>CM</u>		<u>IN</u>
25.55	MEAN	10.06
0.06	STD. ERROR (MEAN)	0.02
1.37	STANDARD DEVIATION	0.54
0.04	STD. ERROR (STD.DEV)	0.02
22.00	MINIMUM	8.66
30.40	MAXIMUM	11.97
SKEWNESS		0.36
KURTOSIS		2.85
COEFFICIENT OF VARIATION		5.4%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
28.31	MEAN	11.15
0.04	STD. ERROR (MEAN)	0.02
1.52	STANDARD DEVIATION	0.60
0.03	STD. ERROR (STD.DEV)	0.01
23.00	MINIMUM	9.06
33.30	MAXIMUM	13.11
SKEWNESS		0.17
KURTOSIS		2.99
COEFFICIENT OF VARIATION		5.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES			MALES			
E	FPct	CumF	CumFPct		CM		E	FPct	CumF	CumFPct
2	0.32	2	0.32	21.75	-	22.25				
3	0.48	5	0.81	22.25	-	22.75				
9	1.45	14	2.26	22.75	-	23.25	2	0.15	2	0.15
35	5.65	49	7.90	23.25	-	23.75	1	0.08	3	0.23
63	10.16	112	18.06	23.75	-	24.25	0	0.00	3	0.23
85	13.71	197	31.77	24.25	-	24.75	4	0.31	7	0.54
77	12.42	274	44.19	24.75	-	25.25	12	0.92	19	1.46
78	12.58	352	56.77	25.25	-	25.75	27	2.08	46	3.54
84	13.55	436	70.32	25.75	-	26.25	53	4.07	99	7.61
60	9.68	496	80.00	26.25	-	26.75	104	7.99	203	15.60
49	7.90	545	87.90	26.75	-	27.25	130	9.99	333	25.60
35	5.65	580	93.55	27.25	-	27.75	146	11.22	479	36.82
24	3.87	604	97.42	27.75	-	28.25	178	13.68	657	50.50
7	1.13	611	98.55	28.25	-	28.75	149	11.45	806	61.95
5	0.81	616	99.35	28.75	-	29.25	148	11.38	954	73.33
2	0.32	618	99.68	29.25	-	29.75	121	9.30	1075	82.63
1	0.16	619	99.84	29.75	-	30.25	87	6.69	1162	89.32
1	0.16	620	100.00	30.25	-	30.75	63	4.84	1225	94.16
				30.75	-	31.25	29	2.23	1254	96.39
				31.25	-	31.75	27	2.08	1281	98.46
				31.75	-	32.25	12	0.92	1293	99.39
				32.25	-	32.75	4	0.31	1297	99.69
				32.75	-	33.25	3	0.23	1300	99.92
				33.25	-	33.75	1	0.08	1301	100.00

(D16) EYE HEIGHT

The vertical distance between a standing surface and the ectocanthus landmark of a participant standing erect with the head in the Frankfurt plane is calculated as follows: EYE HEIGHT SITTING plus STATURE minus SITTING HEIGHT.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
138.70	54.61	1ST	149.40	58.82
139.50	54.92	2ND	150.80	59.37
140.50	55.31	3RD	151.50	59.65
141.61	55.75	5TH	153.11	60.28
143.61	56.54	10TH	155.00	61.02
145.12	57.14	15TH	156.30	61.54
145.92	57.45	20TH	157.80	62.13
147.20	57.95	25TH	159.10	62.64
148.43	58.44	30TH	160.00	62.99
149.30	58.78	35TH	160.74	63.28
150.30	59.17	40TH	161.70	63.66
150.90	59.41	45TH	162.60	64.02
151.60	59.69	50TH	163.30	64.29
152.26	59.94	55TH	164.10	64.61
153.00	60.24	60TH	164.96	64.94
153.70	60.51	65TH	165.77	65.27
154.60	60.87	70TH	166.90	65.71
155.70	61.30	75TH	167.98	66.13
156.78	61.72	80TH	169.60	66.77
157.90	62.17	85TH	171.00	67.32
159.49	62.80	90TH	172.89	68.07
162.00	63.78	95TH	175.49	69.09
163.44	64.34	97TH	177.30	69.80
164.16	64.63	98TH	178.29	70.20
165.20	65.04	99TH	180.00	70.87

(D16) EYE HEIGHT

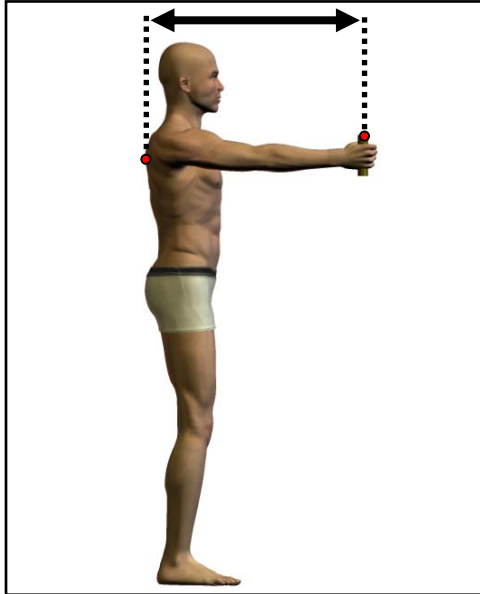
FEMALES		
CM		IN
151.58	MEAN	59.68
0.24	STD. ERROR (MEAN)	0.10
6.04	STANDARD DEVIATION	2.38
0.17	STD. ERROR (STD.DEV)	0.07
135.10	MINIMUM	53.19
168.50	MAXIMUM	66.34
SKEWNESS		0.08
KURTOSIS		-0.29
COEFFICIENT OF VARIATION		4.0%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
163.64	MEAN	64.43
0.19	STD. ERROR (MEAN)	0.07
6.82	STANDARD DEVIATION	2.68
0.13	STD. ERROR (STD.DEV)	0.05
141.70	MINIMUM	55.79
186.10	MAXIMUM	73.27
SKEWNESS		0.20
KURTOSIS		2.89
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES		MALES			
E	FPct	CumF	CumFPct	CM		E	FPct	CumF	CumFPct
1	0.16	1	0.16	134.75	-	136.25			
2	0.32	3	0.48	136.25	-	137.75			
8	1.29	11	1.77	137.75	-	139.25			
9	1.45	20	3.23	139.25	-	140.75			
19	3.06	39	6.29	140.75	-	142.25	1	0.08	0.08
25	4.03	64	10.32	142.25	-	143.75	0	0.00	0.08
33	5.32	97	15.65	143.75	-	145.25	1	0.08	0.15
47	7.58	144	23.23	145.25	-	146.75	3	0.23	0.38
37	5.97	181	29.19	146.75	-	148.25	1	0.08	0.46
48	7.74	229	36.94	148.25	-	149.75	10	0.77	1.23
67	10.81	296	47.74	149.75	-	151.25	19	1.46	2.69
64	10.32	360	58.06	151.25	-	152.75	27	2.08	4.77
63	10.16	423	68.23	152.75	-	154.25	37	2.85	7.62
43	6.94	466	75.16	154.25	-	155.75	67	5.15	12.77
39	6.29	505	81.45	155.75	-	157.25	67	5.15	17.92
36	5.81	541	87.26	157.25	-	158.75	73	5.62	23.54
29	4.68	570	91.94	158.75	-	160.25	111	8.54	32.08
16	2.58	586	94.52	160.25	-	161.75	105	8.08	40.15
15	2.42	601	96.94	161.75	-	163.25	118	9.08	49.23
11	1.77	612	98.71	163.25	-	164.75	129	9.92	59.15
4	0.65	616	99.35	164.75	-	166.25	101	7.77	66.92
1	0.16	617	99.52	166.25	-	167.75	96	7.38	74.31
3	0.48	620	100.00	167.75	-	169.25	56	4.31	78.62
				169.25	-	170.75	71	5.46	84.08
				170.75	-	172.25	58	4.46	88.54
				172.25	-	173.75	38	2.92	91.46
				173.75	-	175.25	44	3.38	94.85
				175.25	-	176.75	23	1.77	96.62
				176.75	-	178.25	18	1.38	98.00
				178.25	-	179.75	11	0.85	98.85
				179.75	-	181.25	6	0.46	99.31
				181.25	-	182.75	5	0.38	99.69
				182.75	-	184.25	3	0.23	99.92
				184.25	-	185.75	0	0.00	99.92
				185.75	-	187.25	1	0.08	100.00

(D17) FUNCTIONAL GRIP REACH

The horizontal distance between the vertical plane of the back and the center of a 1-1/4-in diameter dowel gripped in the right hand of a participant standing erect with the back against a wall and the arm and hand extended forward horizontally is calculated as follows: THUMB TIP REACH minus ANSUR mean of WRIST-THUMB TIP LENGTH plus ANSUR mean of WRIST-CENTER OF GRIP LENGTH.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
60.92	23.99	1ST	65.80	25.91
61.84	24.35	2ND	66.40	26.14
62.30	24.53	3RD	67.00	26.38
62.90	24.76	5TH	67.60	26.61
63.90	25.16	10TH	69.10	27.20
64.80	25.51	15TH	70.10	27.60
65.30	25.71	20TH	70.80	27.87
65.80	25.91	25TH	71.40	28.11
66.40	26.14	30TH	71.80	28.27
66.90	26.34	35TH	72.40	28.50
67.40	26.54	40TH	72.80	28.66
67.70	26.65	45TH	73.20	28.82
68.10	26.81	50TH	73.50	28.94
68.60	27.01	55TH	74.10	29.17
68.90	27.13	60TH	74.60	29.37
69.50	27.36	65TH	75.20	29.61
70.00	27.56	70TH	75.90	29.88
70.50	27.76	75TH	76.40	30.08
71.20	28.03	80TH	77.20	30.39
71.80	28.27	85TH	78.19	30.78
72.50	28.54	90TH	79.09	31.14
73.80	29.06	95TH	80.90	31.85
74.44	29.31	97TH	81.60	32.13
74.86	29.47	98TH	82.40	32.44
76.80	30.24	99TH	83.90	33.03

(D17) FUNCTIONAL GRIP REACH

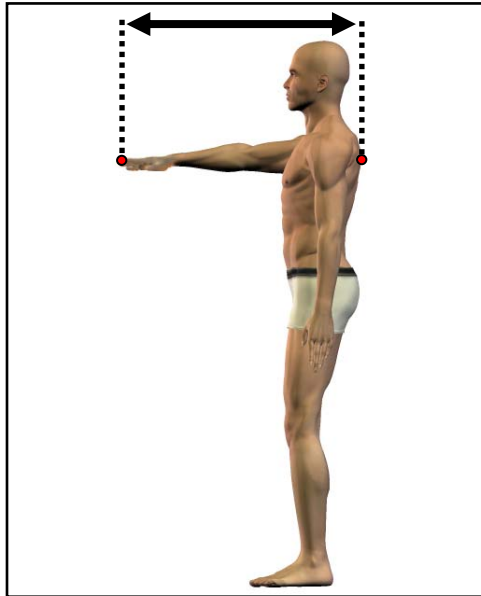
FEMALES		
<u>CM</u>		<u>IN</u>
68.22	MEAN	26.86
0.13	STD. ERROR (MEAN)	0.05
3.31	STANDARD DEVIATION	1.30
0.09	STD. ERROR (STD.DEV)	0.04
59.20	MINIMUM	23.31
78.80	MAXIMUM	31.02
SKEWNESS		0.14
KURTOSIS		2.84
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		619

MALES		
<u>CM</u>		<u>IN</u>
73.94	MEAN	29.11
0.11	STD. ERROR (MEAN)	0.04
3.90	STANDARD DEVIATION	1.54
0.08	STD. ERROR (STD.DEV)	0.03
62.70	MINIMUM	24.69
87.10	MAXIMUM	34.29
SKEWNESS		0.26
KURTOSIS		3.06
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.16	1	0.16	58.55	-	59.55					
3	0.48	4	0.65	59.55	-	60.55					
5	0.81	9	1.45	60.55	-	61.55					
14	2.26	23	3.72	61.55	-	62.55					
29	4.68	52	8.40	62.55	-	63.55	2	0.15	2	0.15	
29	4.68	81	13.09	63.55	-	64.55	3	0.23	5	0.38	
59	9.53	140	22.62	64.55	-	65.55	6	0.46	11	0.85	
53	8.56	193	31.18	65.55	-	66.55	21	1.62	32	2.46	
73	11.79	266	42.97	66.55	-	67.55	31	2.38	63	4.85	
73	11.79	339	54.77	67.55	-	68.55	35	2.69	98	7.54	
71	11.47	410	66.24	68.55	-	69.55	58	4.46	156	12.00	
56	9.05	466	75.28	69.55	-	70.55	83	6.38	239	18.38	
52	8.40	518	83.68	70.55	-	71.55	122	9.38	361	27.77	
42	6.79	560	90.47	71.55	-	72.55	125	9.62	486	37.38	
24	3.88	584	94.35	72.55	-	73.55	166	12.77	652	50.15	
18	2.91	602	97.25	73.55	-	74.55	126	9.69	778	59.85	
7	1.13	609	98.38	74.55	-	75.55	98	7.54	876	67.38	
4	0.65	613	99.03	75.55	-	76.55	115	8.85	991	76.23	
5	0.81	618	99.84	76.55	-	77.55	76	5.85	1067	82.08	
0	0.00	618	99.84	77.55	-	78.55	70	5.38	1137	87.46	
1	0.16	619	100.00	78.55	-	79.55	54	4.15	1191	91.62	
				79.55	-	80.55	38	2.92	1229	94.54	
				80.55	-	81.55	31	2.38	1260	96.92	
				81.55	-	82.55	16	1.23	1276	98.15	
				82.55	-	83.55	10	0.77	1286	98.92	
				83.55	-	84.55	5	0.38	1291	99.31	
				84.55	-	85.55	4	0.31	1295	99.62	
				85.55	-	86.55	3	0.23	1298	99.85	
				86.55	-	87.55	2	0.15	1300	100.00	

(D18) INDEX FINGER REACH

The horizontal distance between the vertical plane of the back and the tip of the right index finger of a participant standing erect with the back against a wall and the arm, hand, and fingers extended forward horizontally is calculated as follows: THUMBTIP REACH minus ANSUR mean of WRIST-THUMBTIP LENGTH plus ANSUR mean of WRIST-INDEX FINGER LENGTH.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
71.22	28.04	1ST	76.90	30.28
72.14	28.41	2ND	77.50	30.51
72.60	28.58	3RD	78.10	30.75
73.20	28.82	5TH	78.70	30.98
74.20	29.21	10TH	80.20	31.57
75.10	29.57	15TH	81.20	31.97
75.60	29.76	20TH	81.90	32.24
76.10	29.96	25TH	82.50	32.48
76.70	30.20	30TH	82.90	32.64
77.20	30.39	35TH	83.50	32.87
77.70	30.59	40TH	83.90	33.03
78.00	30.71	45TH	84.30	33.19
78.40	30.87	50TH	84.60	33.31
78.90	31.06	55TH	85.20	33.54
79.20	31.18	60TH	85.70	33.74
79.80	31.42	65TH	86.30	33.98
80.30	31.61	70TH	87.00	34.25
80.80	31.81	75TH	87.50	34.45
81.50	32.09	80TH	88.30	34.76
82.10	32.32	85TH	89.29	35.15
82.80	32.60	90TH	90.19	35.51
84.10	33.11	95TH	92.00	36.22
84.74	33.37	97TH	92.70	36.50
85.16	33.52	98TH	93.50	36.81
87.10	34.29	99TH	95.00	37.40

(D18) INDEX FINGER REACH

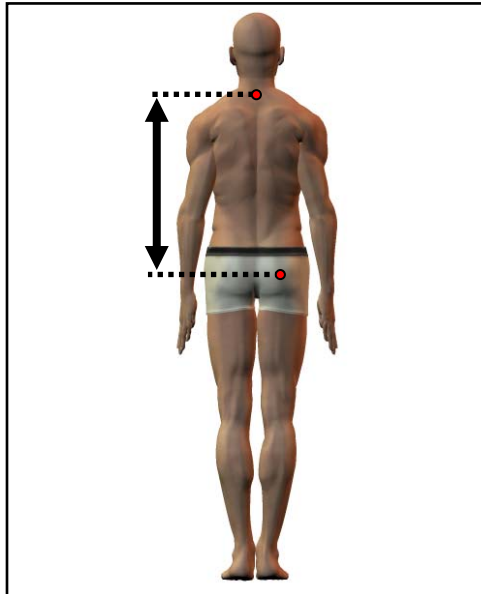
FEMALES		
<u>CM</u>		<u>IN</u>
78.52	MEAN	30.91
0.13	STD. ERROR (MEAN)	0.05
3.31	STANDARD DEVIATION	1.30
0.09	STD. ERROR (STD.DEV)	0.04
69.50	MINIMUM	27.36
89.10	MAXIMUM	35.08
SKEWNESS		0.14
KURTOSIS		2.84
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		619

MALES		
<u>CM</u>		<u>IN</u>
85.04	MEAN	33.48
0.11	STD. ERROR (MEAN)	0.04
3.90	STANDARD DEVIATION	1.54
0.08	STD. ERROR (STD.DEV)	0.03
73.80	MINIMUM	29.06
98.20	MAXIMUM	38.66
SKEWNESS		0.26
KURTOSIS		3.06
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
1	0.16	1	0.16	68.55	- 69.55	2	0.15	2	0.15		
2	0.32	3	0.48	69.55	- 70.55	2	0.15	4	0.31		
5	0.81	8	1.29	70.55	- 71.55	7	0.54	11	0.85		
9	1.45	17	2.75	71.55	- 72.55	17	1.31	28	2.15		
25	4.04	42	6.79	72.55	- 73.55	31	2.38	59	4.54		
26	4.20	68	10.99	73.55	- 74.55	33	2.54	92	7.08		
54	8.72	122	19.71	74.55	- 75.55	61	4.69	153	11.77		
53	8.56	175	28.27	75.55	- 76.55	76	5.85	229	17.62		
58	9.37	233	37.64	76.55	- 77.55	120	9.23	349	26.85		
87	14.05	320	51.70	77.55	- 78.55	118	9.08	467	35.92		
70	11.31	390	63.00	78.55	- 79.55	166	12.77	633	48.69		
60	9.69	450	72.70	79.55	- 80.55	132	10.15	765	58.85		
53	8.56	503	81.26	80.55	- 81.55	102	7.85	867	66.69		
49	7.92	552	89.18	81.55	- 82.55	111	8.54	978	75.23		
21	3.39	573	92.57	82.55	- 83.55	82	6.31	1060	81.54		
24	3.88	597	96.45	83.55	- 84.55	66	5.08	1126	86.62		
12	1.94	609	98.38	84.55	- 85.55	60	4.62	1186	91.23		
2	0.32	611	98.71	85.55	- 86.55	41	3.15	1227	94.38		
5	0.81	616	99.52	86.55	- 87.55	32	2.46	1259	96.85		
2	0.32	618	99.84	87.55	- 88.55	16	1.23	1275	98.08		
1	0.16	619	100.00	88.55	- 89.55	10	0.77	1285	98.85		
				89.55	- 90.55	5	0.38	1290	99.23		
				90.55	- 91.55	5	0.38	1295	99.62		
				91.55	- 92.55	3	0.23	1298	99.85		
				92.55	- 93.55	2	0.15	1300	100.00		
				93.55	- 94.55						
				94.55	- 95.55						
				95.55	- 96.55						
				96.55	- 97.55						
				97.55	- 98.55						

(D19) NECK-BUTTOCK LENGTH

The vertical distance between the cervicale landmark and the buttock point right landmark is calculated as follows: CERVICALE HEIGHT minus BUTTOCK HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
48.54	19.11	1ST	55.30	21.77
49.37	19.44	2ND	55.90	22.01
49.90	19.65	3RD	56.61	22.28
50.51	19.88	5TH	57.20	22.52
51.50	20.28	10TH	58.30	22.95
52.22	20.56	15TH	59.00	23.23
52.60	20.71	20TH	59.50	23.43
53.20	20.94	25TH	60.10	23.66
53.70	21.14	30TH	60.60	23.86
54.30	21.38	35TH	61.00	24.02
54.50	21.46	40TH	61.40	24.17
54.90	21.61	45TH	61.80	24.33
55.30	21.77	50TH	62.30	24.53
55.60	21.89	55TH	62.60	24.65
56.00	22.05	60TH	63.00	24.80
56.40	22.20	65TH	63.40	24.96
56.87	22.39	70TH	63.90	25.16
57.30	22.56	75TH	64.40	25.35
57.78	22.75	80TH	64.86	25.53
58.30	22.95	85TH	65.50	25.79
59.10	23.27	90TH	66.30	26.10
60.20	23.70	95TH	67.49	26.57
60.77	23.93	97TH	68.19	26.85
61.46	24.19	98TH	68.90	27.13
63.08	24.83	99TH	69.60	27.40

(D19) NECK-BUTTOCK LENGTH

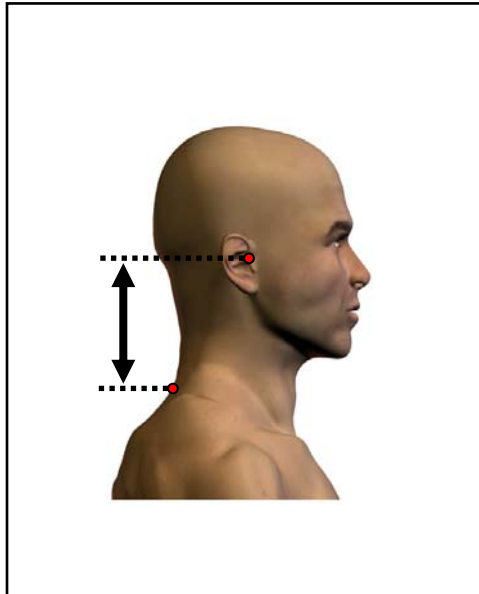
FEMALES		
<u>CM</u>		<u>IN</u>
55.30	MEAN	21.77
0.12	STD. ERROR (MEAN)	0.05
2.95	STANDARD DEVIATION	1.16
0.08	STD. ERROR (STD.DEV)	0.03
46.20	MINIMUM	18.19
64.90	MAXIMUM	25.55
SKEWNESS		0.11
KURTOSIS		3.01
COEFFICIENT OF VARIATION		5.3%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
62.26	MEAN	24.51
0.09	STD. ERROR (MEAN)	0.03
3.11	STANDARD DEVIATION	1.22
0.06	STD. ERROR (STD.DEV)	0.02
53.10	MINIMUM	20.91
72.30	MAXIMUM	28.46
SKEWNESS		0.08
KURTOSIS		2.93
COEFFICIENT OF VARIATION		5.0%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	45.75	-	46.25					
0	0.00	1	0.16	46.25	-	46.75					
0	0.00	1	0.16	46.75	-	47.25					
1	0.16	2	0.32	47.25	-	47.75					
3	0.48	5	0.81	47.75	-	48.25					
2	0.32	7	1.13	48.25	-	48.75					
5	0.81	12	1.94	48.75	-	49.25					
5	0.81	17	2.74	49.25	-	49.75					
7	1.13	24	3.87	49.75	-	50.25					
13	2.10	37	5.97	50.25	-	50.75					
11	1.77	48	7.74	50.75	-	51.25					
24	3.87	72	11.61	51.25	-	51.75					
21	3.39	93	15.00	51.75	-	52.25					
37	5.97	130	20.97	52.25	-	52.75					
30	4.84	160	25.81	52.75	-	53.25		1	0.08	1	0.08
29	4.68	189	30.48	53.25	-	53.75		2	0.15	3	0.23
26	4.19	215	34.68	53.75	-	54.25		3	0.23	6	0.46
50	8.06	265	42.74	54.25	-	54.75		3	0.23	9	0.69
42	6.77	307	49.52	54.75	-	55.25		3	0.23	12	0.92
45	7.26	352	56.77	55.25	-	55.75		8	0.61	20	1.54
43	6.94	395	63.71	55.75	-	56.25		13	1.00	33	2.54
32	5.16	427	68.87	56.25	-	56.75		10	0.77	43	3.31
35	5.65	462	74.52	56.75	-	57.25		23	1.77	66	5.07
34	5.48	496	80.00	57.25	-	57.75		22	1.69	88	6.76
30	4.84	526	84.84	57.75	-	58.25		34	2.61	122	9.38
21	3.39	547	88.23	58.25	-	58.75		48	3.69	170	13.07
14	2.26	561	90.48	58.75	-	59.25		54	4.15	224	17.22
15	2.42	576	92.90	59.25	-	59.75		55	4.23	279	21.45
15	2.42	591	95.32	59.75	-	60.25		60	4.61	339	26.06
11	1.77	602	97.10	60.25	-	60.75		77	5.92	416	31.98
4	0.65	606	97.74	60.75	-	61.25		78	6.00	494	37.97
5	0.81	611	98.55	61.25	-	61.75		83	6.38	577	44.35
0	0.00	611	98.55	61.75	-	62.25		72	5.53	649	49.88
1	0.16	612	98.71	62.25	-	62.75		95	7.30	744	57.19
4	0.65	616	99.35	62.75	-	63.25		72	5.53	816	62.72
2	0.32	618	99.68	63.25	-	63.75		74	5.69	890	68.41
1	0.16	619	99.84	63.75	-	64.25		71	5.46	961	73.87
0	0.00	619	99.84	64.25	-	64.75		66	5.07	1027	78.94
1	0.16	620	100.00	64.75	-	65.25		55	4.23	1082	83.17
				65.25	-	65.75		49	3.77	1131	86.93
				65.75	-	66.25		39	3.00	1170	89.93
				66.25	-	66.75		31	2.38	1201	92.31
				66.75	-	67.25		22	1.69	1223	94.00
				67.25	-	67.75		23	1.77	1246	95.77
				67.75	-	68.25		19	1.46	1265	97.23
				68.25	-	68.75		9	0.69	1274	97.92
				68.75	-	69.25		8	0.61	1282	98.54
				69.25	-	69.75		10	0.77	1292	99.31
				69.75	-	70.25		2	0.15	1294	99.46
				70.25	-	70.75		1	0.08	1295	99.54
				70.75	-	71.25		1	0.08	1296	99.62
				71.25	-	71.75		3	0.23	1299	99.85
				71.75	-	72.25		1	0.08	1300	99.92
				72.25	-	72.75		1	0.08	1301	100.00

(D20) NECK LINK

The vertical distance between the cervicale landmark and the tragon landmark is calculated as follows: STATURE minus TRAGION-TOP OF HEAD minus CERVICALE HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
8.32	3.28	1ST	7.81	3.07
8.60	3.39	2ND	8.30	3.27
8.86	3.49	3RD	8.60	3.39
9.01	3.54	5TH	8.80	3.46
9.50	3.74	10TH	9.40	3.70
9.70	3.82	15TH	9.70	3.82
10.00	3.94	20TH	9.90	3.90
10.10	3.98	25TH	10.20	4.02
10.30	4.06	30TH	10.40	4.09
10.40	4.09	35TH	10.60	4.17
10.50	4.13	40TH	10.70	4.21
10.65	4.19	45TH	11.00	4.33
10.80	4.25	50TH	11.10	4.37
11.00	4.33	55TH	11.20	4.41
11.10	4.37	60TH	11.40	4.49
11.30	4.45	65TH	11.60	4.57
11.50	4.53	70TH	11.80	4.65
11.70	4.61	75TH	12.10	4.76
11.90	4.69	80TH	12.30	4.84
12.20	4.80	85TH	12.50	4.92
12.40	4.88	90TH	12.90	5.08
12.90	5.08	95TH	13.50	5.31
13.10	5.16	97TH	13.70	5.39
13.20	5.20	98TH	14.10	5.55
13.74	5.40	99TH	14.50	5.71

(D20) NECK LINK

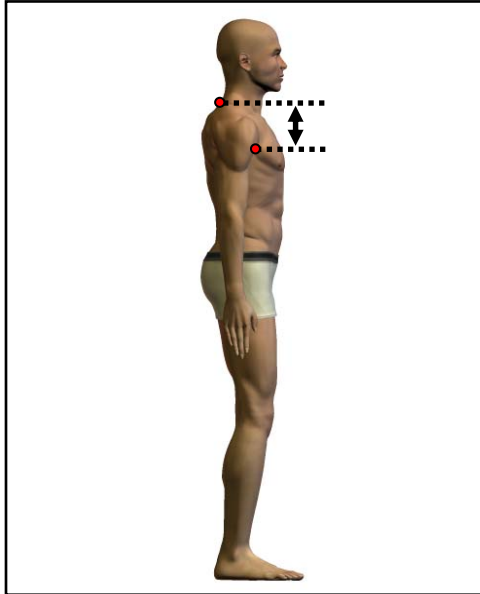
FEMALES		
<u>CM</u>		<u>IN</u>
10.90	MEAN	4.29
0.05	STD. ERROR (MEAN)	0.02
1.16	STANDARD DEVIATION	0.45
0.03	STD. ERROR (STD.DEV)	0.01
7.00	MINIMUM	2.76
14.60	MAXIMUM	5.75
SKEWNESS		0.16
KURTOSIS		2.96
COEFFICIENT OF VARIATION		10.6%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
11.12	MEAN	4.38
0.04	STD. ERROR (MEAN)	0.01
1.38	STANDARD DEVIATION	0.54
0.03	STD. ERROR (STD.DEV)	0.01
6.30	MINIMUM	2.48
15.20	MAXIMUM	5.98
SKEWNESS		0.07
KURTOSIS		2.94
COEFFICIENT OF VARIATION		12.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
				6.15	-	6.35	1	0.08	1	0.08	
				6.35	-	6.55	0	0.00	1	0.08	
				6.55	-	6.75	0	0.00	1	0.08	
				6.75	-	6.95	0	0.00	1	0.08	
				6.95	-	7.15	1	0.08	2	0.15	
1	0.16	1	0.16	7.15	-	7.35	0	0.00	2	0.15	
0	0.00	1	0.16	7.35	-	7.55	1	0.08	3	0.23	
0	0.00	1	0.16	7.55	-	7.75	7	0.54	10	0.77	
1	0.16	2	0.32	7.75	-	7.95	3	0.23	13	1.00	
1	0.16	3	0.48	7.95	-	8.15	3	0.23	16	1.23	
3	0.48	6	0.97	8.15	-	8.35	11	0.85	27	2.08	
4	0.65	10	1.61	8.35	-	8.55	10	0.77	37	2.84	
5	0.81	15	2.42	8.55	-	8.75	16	1.23	53	4.07	
10	1.61	25	4.03	8.75	-	8.95	22	1.69	75	5.76	
12	1.94	37	5.97	8.95	-	9.15	23	1.77	98	7.53	
14	2.26	51	8.23	9.15	-	9.35	31	2.38	129	9.92	
16	2.58	67	10.81	9.35	-	9.55	38	2.92	167	12.84	
27	4.35	94	15.16	9.55	-	9.75	43	3.31	210	16.14	
27	4.35	121	19.52	9.75	-	9.95	51	3.92	261	20.06	
42	6.77	163	26.29	9.95	-	10.15	54	4.15	315	24.21	
43	6.94	206	33.23	10.15	-	10.35	69	5.30	384	29.52	
45	7.26	251	40.48	10.35	-	10.55	63	4.84	447	34.36	
54	8.71	305	49.19	10.55	-	10.75	74	5.69	521	40.05	
35	5.65	340	54.84	10.75	-	10.95	62	4.77	583	44.81	
35	5.65	375	60.48	10.95	-	11.15	93	7.15	676	51.96	
38	6.13	413	66.61	11.15	-	11.35	75	5.76	751	57.72	
22	3.55	435	70.16	11.35	-	11.55	67	5.15	818	62.87	
34	5.48	469	75.65	11.55	-	11.75	67	5.15	885	68.02	
31	5.00	500	80.65	11.75	-	11.95	60	4.61	945	72.64	
26	4.19	526	84.84	11.95	-	12.15	54	4.15	999	76.79	
30	4.84	556	89.68	12.15	-	12.35	60	4.61	1059	81.40	
13	2.10	569	91.77	12.35	-	12.55	51	3.92	1110	85.32	
7	1.13	576	92.90	12.55	-	12.75	38	2.92	1148	88.24	
20	3.23	596	96.13	12.75	-	12.95	27	2.08	1175	90.32	
7	1.13	603	97.26	12.95	-	13.15	23	1.77	1198	92.08	
7	1.13	610	98.39	13.15	-	13.35	24	1.84	1222	93.93	
4	0.65	614	99.03	13.35	-	13.55	22	1.69	1244	95.62	
0	0.00	614	99.03	13.55	-	13.75	21	1.61	1265	97.23	
1	0.16	615	99.19	13.75	-	13.95	5	0.38	1270	97.62	
2	0.32	617	99.52	13.95	-	14.15	8	0.61	1278	98.23	
2	0.32	619	99.84	14.15	-	14.35	5	0.38	1283	98.62	
0	0.00	619	99.84	14.35	-	14.55	9	0.69	1292	99.31	
1	0.16	620	100.00	14.55	-	14.75	2	0.15	1294	99.46	
				14.75	-	14.95	3	0.23	1297	99.69	
				14.95	-	15.15	2	0.15	1299	99.85	
				15.15	-	15.35	2	0.15	1301	100.00	

(D21) NECK-SCYE LENGTH

The vertical distance between the cervicale landmark and the anterior scye landmark is calculated as follows: CERVICALE HEIGHT minus AXILLA HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
12.90	5.08	1ST	14.90	5.87
13.20	5.20	2ND	15.30	6.02
13.30	5.24	3RD	15.60	6.14
13.50	5.31	5TH	16.00	6.30
13.90	5.47	10TH	16.60	6.54
14.20	5.59	15TH	17.00	6.69
14.50	5.71	20TH	17.20	6.77
14.70	5.79	25TH	17.40	6.85
14.80	5.83	30TH	17.60	6.93
15.00	5.91	35TH	17.80	7.01
15.20	5.98	40TH	18.00	7.09
15.30	6.02	45TH	18.20	7.17
15.50	6.10	50TH	18.40	7.24
15.66	6.16	55TH	18.60	7.32
15.80	6.22	60TH	18.70	7.36
16.00	6.30	65TH	18.90	7.44
16.20	6.38	70TH	19.10	7.52
16.50	6.50	75TH	19.40	7.64
16.70	6.57	80TH	19.66	7.74
17.00	6.69	85TH	19.90	7.83
17.30	6.81	90TH	20.30	7.99
17.70	6.97	95TH	20.70	8.15
18.20	7.17	97TH	21.20	8.35
18.40	7.24	98TH	21.60	8.50
18.78	7.39	99TH	22.00	8.66

(D21) NECK-SCYE LENGTH

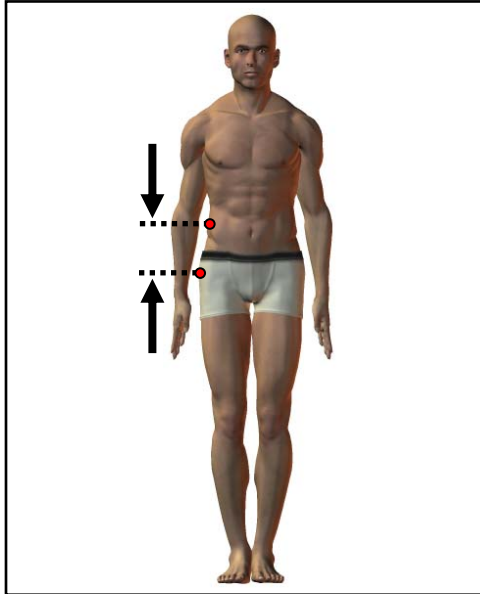
FEMALES		
<u>CM</u>		<u>IN</u>
15.56	MEAN	6.13
0.05	STD. ERROR (MEAN)	0.02
1.30	STANDARD DEVIATION	0.51
0.04	STD. ERROR (STD.DEV)	0.01
11.30	MINIMUM	4.45
19.30	MAXIMUM	7.60
SKEWNESS		0.20
KURTOSIS		2.85
COEFFICIENT OF VARIATION		8.4%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
18.40	MEAN	7.24
0.04	STD. ERROR (MEAN)	0.02
1.49	STANDARD DEVIATION	0.59
0.03	STD. ERROR (STD.DEV)	0.01
13.50	MINIMUM	5.31
28.00	MAXIMUM	11.02
SKEWNESS		0.17
KURTOSIS		4.34
COEFFICIENT OF VARIATION		8.1%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES		MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CENTIMETERS</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	11.25	- 11.75				
0	0.00	1	0.16	11.75	- 12.25				
3	0.48	4	0.65	12.25	- 12.75				
10	1.61	14	2.26	12.75	- 13.25				
30	4.84	44	7.10	13.25	- 13.75	3	0.23	3	0.23
56	9.03	100	16.13	13.75	- 14.25	3	0.23	6	0.46
69	11.13	169	27.26	14.25	- 14.75	6	0.46	12	0.92
104	16.77	273	44.03	14.75	- 15.25	9	0.69	21	1.61
85	13.71	358	57.74	15.25	- 15.75	27	2.08	48	3.69
83	13.39	441	71.13	15.75	- 16.25	43	3.31	91	6.99
60	9.68	501	80.81	16.25	- 16.75	64	4.92	155	11.91
54	8.71	555	89.52	16.75	- 17.25	129	9.92	284	21.83
35	5.65	590	95.16	17.25	- 17.75	153	11.76	437	33.59
14	2.26	604	97.42	17.75	- 18.25	153	11.76	590	45.35
10	1.61	614	99.03	18.25	- 18.75	193	14.83	783	60.18
5	0.81	619	99.84	18.75	- 19.25	158	12.14	941	72.33
1	0.16	620	100.00	19.25	- 19.75	128	9.84	1069	82.17
				19.75	- 20.25	97	7.46	1166	89.62
				20.25	- 20.75	71	5.46	1237	95.08
				20.75	- 21.25	27	2.08	1264	97.16
				21.25	- 21.75	17	1.31	1281	98.46
				21.75	- 22.25	11	0.85	1292	99.31
				22.25	- 22.75	4	0.31	1296	99.62
				22.75	- 23.25	4	0.31	1300	99.92
				23.25	- 23.75	0	0.00	1300	99.92
				23.75	- 24.25	0	0.00	1300	99.92
				24.25	- 24.75	0	0.00	1300	99.92
				24.75	- 25.25	0	0.00	1300	99.92
				25.25	- 25.75	0	0.00	1300	99.92
				25.75	- 26.25	0	0.00	1300	99.92
				26.25	- 26.75	0	0.00	1300	99.92
				26.75	- 27.25	0	0.00	1300	99.92
				27.25	- 27.75	0	0.00	1300	99.92
				27.75	- 28.25	1	0.08	1301	100.00

(D22) PELVIC LINK

The vertical distance between the iliocrestale right landmark and the level of the trochanterion landmark is calculated as follows: ILIOCRISTALE HEIGHT minus TROCHANTERION HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
10.60	4.17	1ST	10.30	4.06
11.00	4.33	2ND	11.00	4.33
11.30	4.45	3RD	11.40	4.49
11.70	4.61	5TH	11.80	4.65
12.60	4.96	10TH	12.30	4.84
13.20	5.20	15TH	12.70	5.00
13.40	5.28	20TH	13.02	5.13
13.80	5.43	25TH	13.30	5.24
14.00	5.51	30TH	13.60	5.35
14.30	5.63	35TH	13.80	5.43
14.60	5.75	40TH	14.10	5.55
14.80	5.83	45TH	14.30	5.63
15.00	5.91	50TH	14.50	5.71
15.30	6.02	55TH	14.70	5.79
15.50	6.10	60TH	14.90	5.87
15.70	6.18	65TH	15.20	5.98
15.90	6.26	70TH	15.40	6.06
16.20	6.38	75TH	15.70	6.18
16.50	6.50	80TH	16.00	6.30
16.80	6.61	85TH	16.40	6.46
17.30	6.81	90TH	17.00	6.69
18.00	7.09	95TH	17.80	7.01
18.50	7.28	97TH	18.30	7.20
18.80	7.40	98TH	19.00	7.48
19.38	7.63	99TH	19.70	7.76

(D22) PELVIC LINK

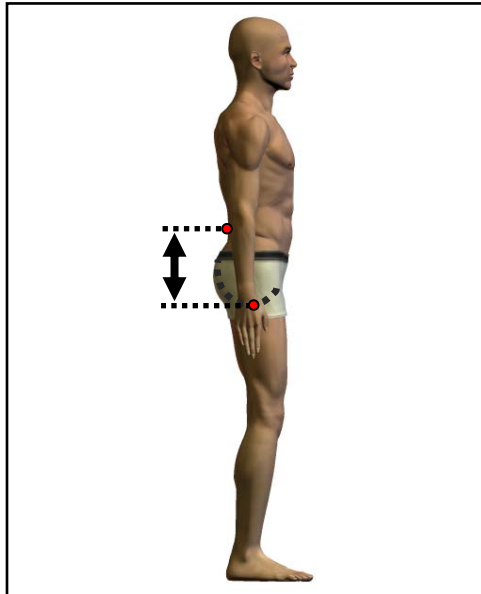
FEMALES		
CM		IN
14.98	MEAN	5.90
0.07	STD. ERROR (MEAN)	0.03
1.83	STANDARD DEVIATION	0.72
0.05	STD. ERROR (STD.DEV)	0.02
9.30	MINIMUM	3.66
20.00	MAXIMUM	7.87
SKEWNESS		-0.08
KURTOSIS		2.99
COEFFICIENT OF VARIATION		12.2%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
14.57	MEAN	5.74
0.05	STD. ERROR (MEAN)	0.02
1.87	STANDARD DEVIATION	0.74
0.04	STD. ERROR (STD.DEV)	0.01
8.20	MINIMUM	3.23
23.20	MAXIMUM	9.13
SKEWNESS		0.39
KURTOSIS		4.01
COEFFICIENT OF VARIATION		12.8%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				F	FPct	CumF	CumFPct
				7.75	-	8.25		1	0.08	1	0.08
				8.25	-	8.75		1	0.08	2	0.15
				8.75	-	9.25		4	0.31	6	0.46
1	0.16	1	0.16	9.25	-	9.75		0	0.00	6	0.46
2	0.32	3	0.48	9.75	-	10.25		5	0.38	11	0.85
5	0.81	8	1.29	10.25	-	10.75		9	0.69	20	1.54
8	1.29	16	2.58	10.75	-	11.25		16	1.23	36	2.77
16	2.58	32	5.16	11.25	-	11.75		27	2.08	63	4.85
9	1.45	41	6.61	11.75	-	12.25		58	4.46	121	9.31
29	4.68	70	11.29	12.25	-	12.75		76	5.85	197	15.15
35	5.65	105	16.94	12.75	-	13.25		109	8.38	306	23.54
43	6.94	148	23.87	13.25	-	13.75		123	9.46	429	33.00
57	9.19	205	33.06	13.75	-	14.25		148	11.38	577	44.38
67	10.81	272	43.87	14.25	-	14.75		162	12.46	739	56.85
67	10.81	339	54.68	14.75	-	15.25		133	10.23	872	67.08
70	11.29	409	65.97	15.25	-	15.75		119	9.15	991	76.23
66	10.65	475	76.61	15.75	-	16.25		95	7.31	1086	83.54
48	7.74	523	84.35	16.25	-	16.75		64	4.92	1150	88.46
31	5.00	554	89.35	16.75	-	17.25		48	3.69	1198	92.15
24	3.87	578	93.23	17.25	-	17.75		32	2.46	1230	94.62
17	2.74	595	95.97	17.75	-	18.25		28	2.15	1258	96.77
12	1.94	607	97.90	18.25	-	18.75		11	0.85	1269	97.62
6	0.97	613	98.87	18.75	-	19.25		11	0.85	1280	98.46
6	0.97	619	99.84	19.25	-	19.75		9	0.69	1289	99.15
1	0.16	620	100.00	19.75	-	20.25		5	0.38	1294	99.54
				20.25	-	20.75		2	0.15	1296	99.69
				20.75	-	21.25		0	0.00	1296	99.69
				21.25	-	21.75		1	0.08	1297	99.77
				21.75	-	22.25		1	0.08	1298	99.85
				22.25	-	22.75		1	0.08	1299	99.92
				22.75	-	23.25		1	0.08	1300	100.00

(D23) RISE (OMPHALION)

The vertical distance between the level of the waist at the navel (omphalion) and the crotch of a participant standing erect is calculated as follows: WAIST HEIGHT (OMPHALION) minus CROTCH HEIGHT.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
14.92	5.88	1ST	15.90	6.26
15.54	6.12	2ND	16.70	6.57
15.80	6.22	3RD	17.00	6.69
16.30	6.42	5TH	17.30	6.81
16.90	6.65	10TH	18.00	7.09
17.30	6.81	15TH	18.43	7.25
17.60	6.93	20TH	18.80	7.40
18.00	7.09	25TH	19.10	7.52
18.20	7.17	30TH	19.36	7.62
18.50	7.28	35TH	19.60	7.72
18.70	7.36	40TH	19.90	7.83
18.90	7.44	45TH	20.10	7.91
19.20	7.56	50TH	20.30	7.99
19.40	7.64	55TH	20.60	8.11
19.70	7.76	60TH	20.80	8.19
20.00	7.87	65TH	21.10	8.31
20.20	7.95	70TH	21.40	8.43
20.50	8.07	75TH	21.80	8.58
20.88	8.22	80TH	22.10	8.70
21.29	8.38	85TH	22.60	8.90
21.70	8.54	90TH	23.10	9.09
22.50	8.86	95TH	23.99	9.45
22.90	9.02	97TH	24.49	9.65
23.26	9.15	98TH	25.00	9.84
23.68	9.32	99TH	25.50	10.04

(D23) RISE (OMPHALION)

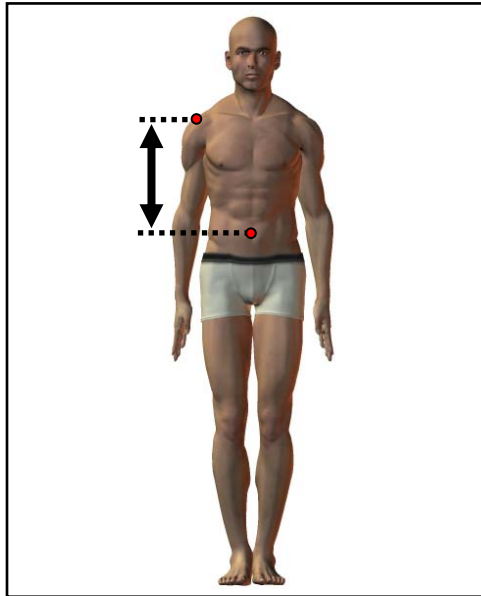
FEMALES		
CM		IN
19.24	MEAN	7.58
0.08	STD. ERROR (MEAN)	0.03
1.87	STANDARD DEVIATION	0.74
0.05	STD. ERROR (STD.DEV)	0.02
13.00	MINIMUM	5.12
24.90	MAXIMUM	9.80
SKEWNESS		0.07
KURTOSIS		2.97
COEFFICIENT OF VARIATION		9.7%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
20.45	MEAN	8.05
0.06	STD. ERROR (MEAN)	0.02
1.99	STANDARD DEVIATION	0.78
0.04	STD. ERROR (STD.DEV)	0.02
14.30	MINIMUM	5.63
27.10	MAXIMUM	10.67
SKEWNESS		0.24
KURTOSIS		2.98
COEFFICIENT OF VARIATION		9.7%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	12.75	-	13.25					
1	0.16	2	0.32	13.25	-	13.75					
1	0.16	3	0.48	13.75	-	14.25					
2	0.32	5	0.81	14.25	-	14.75		1	0.08	1	0.08
3	0.48	8	1.29	14.75	-	15.25		1	0.08	2	0.15
8	1.29	16	2.58	15.25	-	15.75		6	0.46	8	0.61
13	2.10	29	4.68	15.75	-	16.25		6	0.46	14	1.08
22	3.55	51	8.23	16.25	-	16.75		13	1.00	27	2.08
36	5.81	87	14.03	16.75	-	17.25		34	2.61	61	4.69
50	8.06	137	22.10	17.25	-	17.75		42	3.23	103	7.92
52	8.39	189	30.48	17.75	-	18.25		62	4.77	165	12.68
72	11.61	261	42.10	18.25	-	18.75		88	6.76	253	19.45
60	9.68	321	51.77	18.75	-	19.25		111	8.53	364	27.98
59	9.52	380	61.29	19.25	-	19.75		115	8.84	479	36.82
57	9.19	437	70.48	19.75	-	20.25		164	12.61	643	49.42
49	7.90	486	78.39	20.25	-	20.75		122	9.38	765	58.80
41	6.61	527	85.00	20.75	-	21.25		122	9.38	887	68.18
36	5.81	563	90.81	21.25	-	21.75		88	6.76	975	74.94
20	3.23	583	94.03	21.75	-	22.25		82	6.30	1057	81.25
15	2.42	598	96.45	22.25	-	22.75		73	5.61	1130	86.86
10	1.61	608	98.06	22.75	-	23.25		55	4.23	1185	91.08
7	1.13	615	99.19	23.25	-	23.75		38	2.92	1223	94.00
4	0.65	619	99.84	23.75	-	24.25		34	2.61	1257	96.62
0	0.00	619	99.84	24.25	-	24.75		14	1.08	1271	97.69
1	0.16	620	100.00	24.75	-	25.25		11	0.85	1282	98.54
				25.25	-	25.75		11	0.85	1293	99.39
				25.75	-	26.25		6	0.46	1299	99.85
				26.25	-	26.75		1	0.08	1300	99.92
				26.75	-	27.25		1	0.08	1301	100.00

(D24) SHOULDER-WAIST LENGTH (OMPHALION)

The vertical distance between the acromion right landmark and the level of the waist at the navel (omphalion) of a participant standing erect is calculated as follows: ACROMIAL HEIGHT minus WAIST HEIGHT (OMPHALION).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
29.92	11.78	1ST	31.60	12.44
30.40	11.97	2ND	32.20	12.68
30.66	12.08	3RD	32.70	12.87
31.20	12.28	5TH	33.30	13.11
32.00	12.60	10TH	34.10	13.43
32.70	12.87	15TH	34.80	13.70
33.10	13.03	20TH	35.20	13.86
33.50	13.19	25TH	35.60	14.02
33.80	13.31	30TH	36.00	14.17
34.14	13.44	35TH	36.30	14.29
34.50	13.58	40TH	36.70	14.45
34.80	13.70	45TH	37.00	14.57
35.15	13.84	50TH	37.30	14.69
35.50	13.98	55TH	37.70	14.84
35.80	14.09	60TH	37.92	14.93
36.10	14.21	65TH	38.30	15.08
36.50	14.37	70TH	38.70	15.24
36.80	14.49	75TH	39.10	15.39
37.28	14.68	80TH	39.60	15.59
37.70	14.84	85TH	40.20	15.83
38.40	15.12	90TH	40.80	16.06
39.40	15.51	95TH	41.80	16.46
39.84	15.68	97TH	42.59	16.77
40.42	15.91	98TH	43.20	17.01
41.26	16.24	99TH	44.30	17.44

(D24) SHOULDER-WAIST LENGTH (OMPHALION)

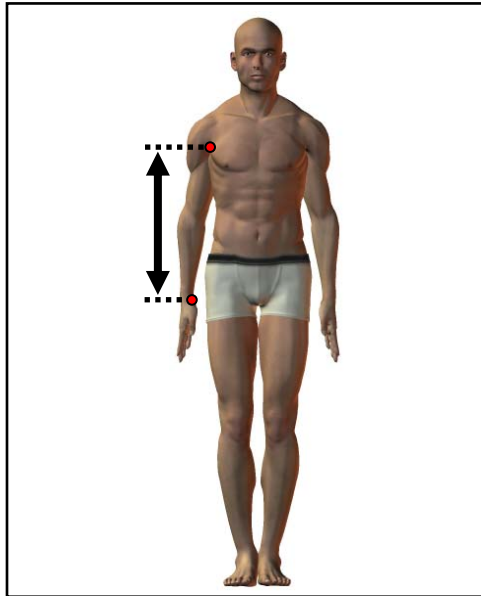
FEMALES		
CM		IN
35.20	MEAN	13.86
0.10	STD. ERROR (MEAN)	0.04
2.46	STANDARD DEVIATION	0.97
0.07	STD. ERROR (STD.DEV)	0.03
28.50	MINIMUM	11.22
44.90	MAXIMUM	17.68
SKEWNESS		0.22
KURTOSIS		3.14
COEFFICIENT OF VARIATION		7.0%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
37.43	MEAN	14.74
0.07	STD. ERROR (MEAN)	0.03
2.63	STANDARD DEVIATION	1.04
0.05	STD. ERROR (STD.DEV)	0.02
29.90	MINIMUM	11.77
47.40	MAXIMUM	18.66
SKEWNESS		0.26
KURTOSIS		3.17
COEFFICIENT OF VARIATION		7.0%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	28.25	-	28.75					
0	0.00	1	0.16	28.75	-	29.25					
4	0.65	5	0.81	29.25	-	29.75					
5	0.81	10	1.61	29.75	-	30.25		1	0.08	1	0.08
11	1.77	21	3.39	30.25	-	30.75		3	0.23	4	0.31
13	2.10	34	5.48	30.75	-	31.25		2	0.15	6	0.46
17	2.74	51	8.23	31.25	-	31.75		7	0.54	13	1.00
18	2.90	69	11.13	31.75	-	32.25		13	1.00	26	2.00
26	4.19	95	15.32	32.25	-	32.75		15	1.15	41	3.15
36	5.81	131	21.13	32.75	-	33.25		20	1.54	61	4.69
50	8.06	181	29.19	33.25	-	33.75		35	2.69	96	7.38
48	7.74	229	36.94	33.75	-	34.25		52	4.00	148	11.38
46	7.42	275	44.35	34.25	-	34.75		46	3.54	194	14.91
39	6.29	314	50.65	34.75	-	35.25		72	5.53	266	20.45
56	9.03	370	59.68	35.25	-	35.75		76	5.84	342	26.29
48	7.74	418	67.42	35.75	-	36.25		93	7.15	435	33.44
41	6.61	459	74.03	36.25	-	36.75		100	7.69	535	41.12
37	5.97	496	80.00	36.75	-	37.25		98	7.53	633	48.65
32	5.16	528	85.16	37.25	-	37.75		98	7.53	731	56.19
24	3.87	552	89.03	37.75	-	38.25		104	7.99	835	64.18
21	3.39	573	92.42	38.25	-	38.75		82	6.30	917	70.48
14	2.26	587	94.68	38.75	-	39.25		81	6.23	998	76.71
12	1.94	599	96.61	39.25	-	39.75		58	4.46	1056	81.17
8	1.29	607	97.90	39.75	-	40.25		58	4.46	1114	85.63
2	0.32	609	98.23	40.25	-	40.75		49	3.77	1163	89.39
5	0.81	614	99.03	40.75	-	41.25		39	3.00	1202	92.39
3	0.48	617	99.52	41.25	-	41.75		28	2.15	1230	94.54
0	0.00	617	99.52	41.75	-	42.25		23	1.77	1253	96.31
1	0.16	618	99.68	42.25	-	42.75		16	1.23	1269	97.54
1	0.16	619	99.84	42.75	-	43.25		7	0.54	1276	98.08
0	0.00	619	99.84	43.25	-	43.75		4	0.31	1280	98.39
0	0.00	619	99.84	43.75	-	44.25		6	0.46	1286	98.85
0	0.00	619	99.84	44.25	-	44.75		6	0.46	1292	99.31
1	0.16	620	100.00	44.75	-	45.25		2	0.15	1294	99.46
				45.25	-	45.75		4	0.31	1298	99.77
				45.75	-	46.25		2	0.15	1300	99.92
				46.25	-	46.75		0	0.00	1300	99.92
				46.75	-	47.25		0	0.00	1300	99.92
				47.25	-	47.75		1	0.08	1301	100.00

(D25) SLEEVE INSEAM

The vertical distance between the anterior-scye-on-the-torso landmark and the stylium landmark of a participant standing erect with the arms straight at the sides is calculated as follows: AXILLA HEIGHT minus WRIST HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
38.84	15.29	1ST	42.00	16.54
39.34	15.49	2ND	43.10	16.97
39.80	15.67	3RD	43.70	17.20
40.20	15.83	5TH	44.30	17.44
41.40	16.30	10TH	45.20	17.80
42.10	16.57	15TH	46.00	18.11
42.42	16.70	20TH	46.40	18.27
42.90	16.89	25TH	46.90	18.46
43.30	17.05	30TH	47.33	18.63
43.60	17.17	35TH	47.70	18.78
44.00	17.32	40TH	48.10	18.94
44.35	17.46	45TH	48.40	19.06
44.70	17.60	50TH	48.90	19.25
45.00	17.72	55TH	49.30	19.41
45.50	17.91	60TH	49.60	19.53
45.80	18.03	65TH	50.00	19.69
46.20	18.19	70TH	50.40	19.84
46.50	18.31	75TH	50.90	20.04
47.00	18.50	80TH	51.40	20.24
47.50	18.70	85TH	52.00	20.47
48.19	18.98	90TH	52.60	20.71
49.40	19.45	95TH	53.90	21.22
50.07	19.72	97TH	54.60	21.50
50.82	20.01	98TH	55.10	21.69
51.76	20.37	99TH	56.00	22.05

(D25) SLEEVE INSEAM

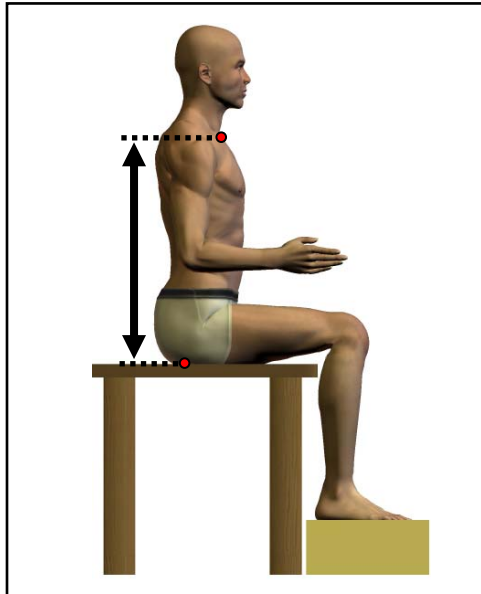
FEMALES		
CM		IN
44.76	MEAN	17.62
0.11	STD. ERROR (MEAN)	0.04
2.70	STANDARD DEVIATION	1.06
0.08	STD. ERROR (STD.DEV)	0.03
36.80	MINIMUM	14.49
52.60	MAXIMUM	20.71
SKEWNESS		0.14
KURTOSIS		2.97
COEFFICIENT OF VARIATION		6.0%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
48.91	MEAN	19.26
0.08	STD. ERROR (MEAN)	0.03
2.94	STANDARD DEVIATION	1.16
0.06	STD. ERROR (STD.DEV)	0.02
38.30	MINIMUM	15.08
58.00	MAXIMUM	22.83
SKEWNESS		0.05
KURTOSIS		3.14
COEFFICIENT OF VARIATION		6.0%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	36.75	-	37.25					
1	0.16	2	0.32	37.25	-	37.75					
1	0.16	3	0.48	37.75	-	38.25					
2	0.32	5	0.81	38.25	-	38.75		2	0.15	2	0.15
5	0.81	10	1.61	38.75	-	39.25		1	0.08	3	0.23
7	1.13	17	2.74	39.25	-	39.75		0	0.00	3	0.23
16	2.58	33	5.32	39.75	-	40.25		1	0.08	4	0.31
9	1.45	42	6.77	40.25	-	40.75		0	0.00	4	0.31
15	2.42	57	9.19	40.75	-	41.25		3	0.23	7	0.54
23	3.71	80	12.90	41.25	-	41.75		1	0.08	8	0.62
25	4.03	105	16.94	41.75	-	42.25		7	0.54	15	1.15
40	6.45	145	23.39	42.25	-	42.75		4	0.31	19	1.46
32	5.16	177	28.55	42.75	-	43.25		8	0.62	27	2.08
49	7.90	226	36.45	43.25	-	43.75		17	1.31	44	3.38
43	6.94	269	43.39	43.75	-	44.25		17	1.31	61	4.69
54	8.71	323	52.10	44.25	-	44.75		31	2.38	92	7.08
36	5.81	359	57.90	44.75	-	45.25		40	3.08	132	10.15
40	6.45	399	64.35	45.25	-	45.75		40	3.08	172	13.23
40	6.45	439	70.81	45.75	-	46.25		64	4.92	236	18.15
39	6.29	478	77.10	46.25	-	46.75		68	5.23	304	23.38
33	5.32	511	82.42	46.75	-	47.25		72	5.54	376	28.92
32	5.16	543	87.58	47.25	-	47.75		90	6.92	466	35.85
20	3.23	563	90.81	47.75	-	48.25		79	6.08	545	41.92
11	1.77	574	92.58	48.25	-	48.75		89	6.85	634	48.77
9	1.45	583	94.03	48.75	-	49.25		76	5.85	710	54.62
17	2.74	600	96.77	49.25	-	49.75		93	7.15	803	61.77
3	0.48	603	97.26	49.75	-	50.25		84	6.46	887	68.23
5	0.81	608	98.06	50.25	-	50.75		75	5.77	962	74.00
3	0.48	611	98.55	50.75	-	51.25		62	4.77	1024	78.77
3	0.48	614	99.03	51.25	-	51.75		54	4.15	1078	82.92
3	0.48	617	99.52	51.75	-	52.25		57	4.38	1135	87.31
3	0.48	620	100.00	52.25	-	52.75		44	3.38	1179	90.69
				52.75	-	53.25		34	2.62	1213	93.31
				53.25	-	53.75		15	1.15	1228	94.46
				53.75	-	54.25		19	1.46	1247	95.92
				54.25	-	54.75		20	1.54	1267	97.46
				54.75	-	55.25		14	1.08	1281	98.54
				55.25	-	55.75		4	0.31	1285	98.85
				55.75	-	56.25		3	0.23	1288	99.08
				56.25	-	56.75		3	0.23	1291	99.31
				56.75	-	57.25		6	0.46	1297	99.77
				57.25	-	57.75		2	0.15	1299	99.92
				57.75	-	58.25		1	0.08	1300	100.00

(D26) SUPRASTERNALE HEIGHT, SITTING

The vertical distance between a sitting surface and the suprasternale landmark of a participant sitting erect is calculated as follows: SUPRASTERNALE HEIGHT minus (STATURE minus SITTING HEIGHT).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
50.13	19.74	1ST	53.90	21.22
51.10	20.12	2ND	54.60	21.50
51.40	20.24	3RD	55.00	21.65
51.90	20.43	5TH	55.70	21.93
52.80	20.79	10TH	56.60	22.28
53.30	20.98	15TH	57.30	22.56
53.80	21.18	20TH	57.80	22.76
54.20	21.34	25TH	58.20	22.91
54.60	21.50	30TH	58.60	23.07
54.80	21.57	35TH	58.90	23.19
55.20	21.73	40TH	59.20	23.31
55.50	21.85	45TH	59.60	23.46
55.80	21.97	50TH	59.90	23.58
56.10	22.09	55TH	60.40	23.78
56.40	22.20	60TH	60.70	23.90
56.77	22.35	65TH	61.10	24.06
57.00	22.44	70TH	61.50	24.21
57.40	22.60	75TH	61.90	24.37
57.90	22.80	80TH	62.40	24.57
58.50	23.03	85TH	63.00	24.80
59.20	23.31	90TH	63.70	25.08
60.30	23.74	95TH	64.70	25.47
61.04	24.03	97TH	65.20	25.67
61.36	24.15	98TH	65.70	25.87
61.70	24.29	99TH	66.40	26.14

(D26) SUPRASTERNALE HEIGHT, SITTING

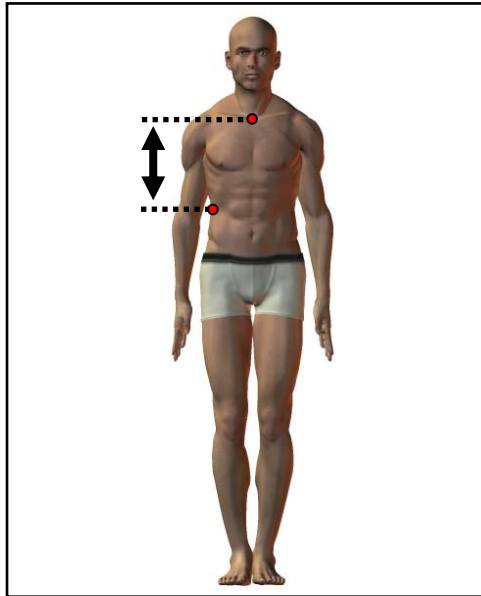
FEMALES		
CM		IN
55.88	MEAN	22.00
0.10	STD. ERROR (MEAN)	0.04
2.48	STANDARD DEVIATION	0.97
0.07	STD. ERROR (STD.DEV)	0.03
48.70	MINIMUM	19.17
63.40	MAXIMUM	24.96
SKEWNESS		0.17
KURTOSIS		2.95
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
60.07	MEAN	23.65
0.08	STD. ERROR (MEAN)	0.03
2.74	STANDARD DEVIATION	1.08
0.05	STD. ERROR (STD.DEV)	0.02
50.90	MINIMUM	20.04
69.50	MAXIMUM	27.36
SKEWNESS		0.08
KURTOSIS		2.96
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	48.25	-	48.75					
0	0.00	1	0.16	48.75	-	49.25					
3	0.48	4	0.65	49.25	-	49.75					
2	0.32	6	0.97	49.75	-	50.25					
1	0.16	7	1.13	50.25	-	50.75					
8	1.29	15	2.42	50.75	-	51.25		1	0.08	1	0.08
15	2.42	30	4.84	51.25	-	51.75		1	0.08	2	0.15
10	1.61	40	6.45	51.75	-	52.25		0	0.00	2	0.15
20	3.23	60	9.68	52.25	-	52.75		2	0.15	4	0.31
25	4.03	85	13.71	52.75	-	53.25		2	0.15	6	0.46
36	5.81	121	19.52	53.25	-	53.75		4	0.31	10	0.77
39	6.29	160	25.81	53.75	-	54.25		10	0.77	20	1.54
47	7.58	207	33.39	54.25	-	54.75		13	1.00	33	2.54
50	8.06	257	41.45	54.75	-	55.25		16	1.23	49	3.77
49	7.90	306	49.35	55.25	-	55.75		18	1.38	67	5.15
49	7.90	355	57.26	55.75	-	56.25		34	2.61	101	7.76
48	7.74	403	65.00	56.25	-	56.75		44	3.38	145	11.15
55	8.87	458	73.87	56.75	-	57.25		45	3.46	190	14.60
29	4.68	487	78.55	57.25	-	57.75		58	4.46	248	19.06
30	4.84	517	83.39	57.75	-	58.25		87	6.69	335	25.75
24	3.87	541	87.26	58.25	-	58.75		84	6.46	419	32.21
18	2.90	559	90.16	58.75	-	59.25		102	7.84	521	40.05
15	2.42	574	92.58	59.25	-	59.75		93	7.15	614	47.19
13	2.10	587	94.68	59.75	-	60.25		89	6.84	703	54.04
12	1.94	599	96.61	60.25	-	60.75		81	6.23	784	60.26
7	1.13	606	97.74	60.75	-	61.25		85	6.53	869	66.79
9	1.45	615	99.19	61.25	-	61.75		74	5.69	943	72.48
2	0.32	617	99.52	61.75	-	62.25		84	6.46	1027	78.94
2	0.32	619	99.84	62.25	-	62.75		48	3.69	1075	82.63
0	0.00	619	99.84	62.75	-	63.25		54	4.15	1129	86.78
1	0.16	620	100.00	63.25	-	63.75		48	3.69	1177	90.47
				63.75	-	64.25		39	3.00	1216	93.47
				64.25	-	64.75		23	1.77	1239	95.23
				64.75	-	65.25		24	1.84	1263	97.08
				65.25	-	65.75		13	1.00	1276	98.08
				65.75	-	66.25		9	0.69	1285	98.77
				66.25	-	66.75		4	0.31	1289	99.08
				66.75	-	67.25		9	0.69	1298	99.77
				67.25	-	67.75		0	0.00	1298	99.77
				67.75	-	68.25		0	0.00	1298	99.77
				68.25	-	68.75		0	0.00	1298	99.77
				68.75	-	69.25		2	0.15	1300	99.92
				69.25	-	69.75		1	0.08	1301	100.00

(D27) SUPRASTERNALE-TENTH RIB LENGTH

The vertical distance between the suprasternale landmark and the tenth rib landmark is calculated as follows: SUPRASTERNALE HEIGHT minus TENTH RIB HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
24.10	9.49	1ST	28.40	11.18
24.70	9.72	2ND	28.70	11.30
25.06	9.87	3RD	29.10	11.46
25.70	10.12	5TH	29.60	11.65
26.30	10.35	10TH	30.10	11.85
26.70	10.51	15TH	30.50	12.01
27.10	10.67	20TH	30.80	12.13
27.30	10.75	25TH	31.10	12.24
27.70	10.91	30TH	31.40	12.36
27.90	10.98	35TH	31.60	12.44
28.10	11.06	40TH	31.90	12.56
28.30	11.14	45TH	32.10	12.64
28.50	11.22	50TH	32.40	12.76
28.70	11.30	55TH	32.60	12.83
28.90	11.38	60TH	32.80	12.91
29.20	11.50	65TH	33.00	12.99
29.40	11.57	70TH	33.24	13.09
29.70	11.69	75TH	33.60	13.23
30.10	11.85	80TH	33.90	13.35
30.50	12.01	85TH	34.20	13.46
30.99	12.20	90TH	34.80	13.70
31.70	12.48	95TH	35.30	13.90
32.24	12.69	97TH	35.89	14.13
32.76	12.89	98TH	36.30	14.29
33.20	13.07	99TH	37.00	14.57

(D27) SUPRASTERNALE-TENTH RIB LENGTH

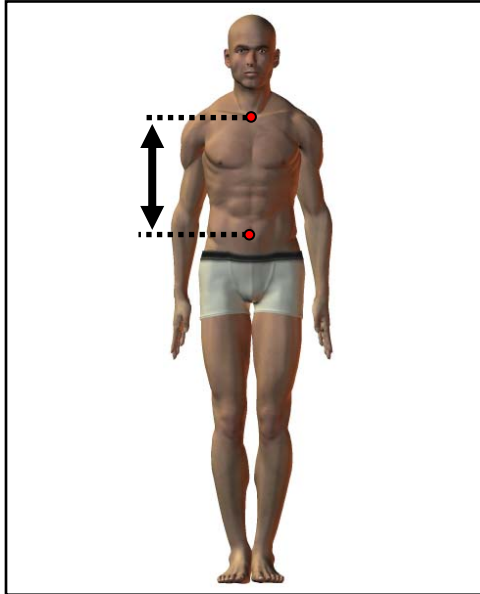
FEMALES		
CM		IN
28.57	MEAN	11.25
0.07	STD. ERROR (MEAN)	0.03
1.83	STANDARD DEVIATION	0.72
0.05	STD. ERROR (STD.DEV)	0.02
23.80	MINIMUM	9.37
34.20	MAXIMUM	13.46
SKEWNESS		0.13
KURTOSIS		3.09
COEFFICIENT OF VARIATION		6.4%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
32.36	MEAN	12.74
0.05	STD. ERROR (MEAN)	0.02
1.81	STANDARD DEVIATION	0.71
0.04	STD. ERROR (STD.DEV)	0.01
25.90	MINIMUM	10.20
38.50	MAXIMUM	15.16
SKEWNESS		0.12
KURTOSIS		3.06
COEFFICIENT OF VARIATION		5.6%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
7	1.13	7	1.13	23.75	-	24.25					
6	0.97	13	2.10	24.25	-	24.75					
9	1.45	22	3.55	24.75	-	25.25					
12	1.94	34	5.48	25.25	-	25.75					
24	3.87	58	9.35	25.75	-	26.25		1	0.08	1	0.08
40	6.45	98	15.81	26.25	-	26.75		0	0.00	1	0.08
48	7.74	146	23.55	26.75	-	27.25		1	0.08	2	0.15
53	8.55	199	32.10	27.25	-	27.75		5	0.38	7	0.54
76	12.26	275	44.35	27.75	-	28.25		4	0.31	11	0.85
73	11.77	348	56.13	28.25	-	28.75		16	1.23	27	2.08
60	9.68	408	65.81	28.75	-	29.25		17	1.31	44	3.38
62	10.00	470	75.81	29.25	-	29.75		43	3.31	87	6.69
42	6.77	512	82.58	29.75	-	30.25		70	5.38	157	12.07
29	4.68	541	87.26	30.25	-	30.75		87	6.69	244	18.75
34	5.48	575	92.74	30.75	-	31.25		117	8.99	361	27.75
16	2.58	591	95.32	31.25	-	31.75		122	9.38	483	37.13
11	1.77	602	97.10	31.75	-	32.25		138	10.61	621	47.73
6	0.97	608	98.06	32.25	-	32.75		152	11.68	773	59.42
8	1.29	616	99.35	32.75	-	33.25		138	10.61	911	70.02
2	0.32	618	99.68	33.25	-	33.75		107	8.22	1018	78.25
2	0.32	620	100.00	33.75	-	34.25		91	6.99	1109	85.24
				34.25	-	34.75		57	4.38	1166	89.62
				34.75	-	35.25		66	5.07	1232	94.70
				35.25	-	35.75		26	2.00	1258	96.69
				35.75	-	36.25		15	1.15	1273	97.85
				36.25	-	36.75		12	0.92	1285	98.77
				36.75	-	37.25		11	0.85	1296	99.62
				37.25	-	37.75		4	0.31	1300	99.92
				37.75	-	38.25		0	0.00	1300	99.92
				38.25	-	38.75		1	0.08	1301	100.00

(D28) SUPRASTERNALE-WAIST LENGTH (OMPHALION)

The vertical distance between the suprasternale landmark and the waist (omphalion) landmark is calculated as follows: SUPRASTERNALE HEIGHT minus WAIST HEIGHT (OMPHALION).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
30.22	11.90	1ST	32.50	12.80
30.60	12.05	2ND	33.00	12.99
30.80	12.13	3RD	33.41	13.15
31.10	12.24	5TH	34.00	13.39
31.90	12.56	10TH	34.62	13.63
32.30	12.72	15TH	35.10	13.82
32.80	12.91	20TH	35.50	13.98
33.10	13.03	25TH	35.90	14.13
33.50	13.19	30TH	36.30	14.29
33.70	13.27	35TH	36.60	14.41
34.00	13.39	40TH	36.90	14.53
34.35	13.52	45TH	37.20	14.65
34.60	13.62	50TH	37.50	14.76
34.80	13.70	55TH	37.70	14.84
35.00	13.78	60TH	38.00	14.96
35.20	13.86	65TH	38.40	15.12
35.50	13.98	70TH	38.70	15.24
35.80	14.09	75TH	39.10	15.39
36.28	14.28	80TH	39.50	15.55
36.60	14.41	85TH	40.00	15.75
37.20	14.65	90TH	40.70	16.02
38.10	15.00	95TH	41.40	16.30
38.64	15.21	97TH	42.00	16.54
39.00	15.35	98TH	42.60	16.77
39.68	15.62	99TH	43.30	17.05

(D28) SUPRASTERNALE-WAIST LENGTH (OMPHALION)

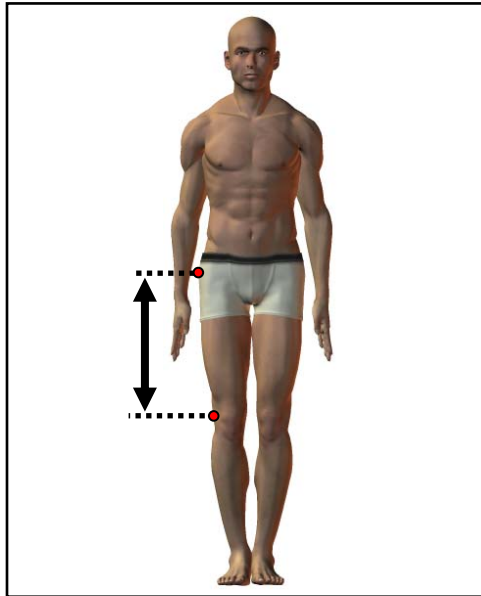
FEMALES		
<u>CM</u>		<u>IN</u>
34.54	MEAN	13.60
0.08	STD. ERROR (MEAN)	0.03
2.06	STANDARD DEVIATION	0.81
0.06	STD. ERROR (STD.DEV)	0.02
29.30	MINIMUM	11.54
41.30	MAXIMUM	16.26
SKEWNESS		0.17
KURTOSIS		2.94
COEFFICIENT OF VARIATION		6.0%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
37.55	MEAN	14.79
0.06	STD. ERROR (MEAN)	0.03
2.33	STANDARD DEVIATION	0.92
0.05	STD. ERROR (STD.DEV)	0.02
29.60	MINIMUM	11.65
45.30	MAXIMUM	17.83
SKEWNESS		0.20
KURTOSIS		3.05
COEFFICIENT OF VARIATION		6.2%
NUMBER OF PARTICIPANTS		1301

FREQUENCIES											
FEMALES											
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>		<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>		
4	0.65	4	0.65	29.25	-	29.75	1	0.08	1	0.08	
2	0.32	6	0.97	29.75	-	30.25	0	0.00	1	0.08	
9	1.45	15	2.42	30.25	-	30.75	0	0.00	1	0.08	
20	3.23	35	5.65	30.75	-	31.25	2	0.15	3	0.23	
17	2.74	52	8.39	31.25	-	31.75	2	0.15	5	0.38	
37	5.97	89	14.35	31.75	-	32.25	5	0.38	10	0.77	
33	5.32	122	19.68	32.25	-	32.75	10	0.77	20	1.54	
42	6.77	164	26.45	32.75	-	33.25	13	1.00	33	2.54	
54	8.71	218	35.16	33.25	-	33.75	21	1.61	54	4.15	
50	8.06	268	43.23	33.75	-	34.25	32	2.46	86	6.61	
70	11.29	338	54.52	34.25	-	34.75	56	4.30	142	10.91	
68	10.97	406	65.48	34.75	-	35.25	73	5.61	215	16.53	
58	9.35	464	74.84	35.25	-	35.75	82	6.30	297	22.83	
32	5.16	496	80.00	35.75	-	36.25	92	7.07	389	29.90	
40	6.45	536	86.45	36.25	-	36.75	94	7.23	483	37.13	
24	3.87	560	90.32	36.75	-	37.25	118	9.07	601	46.20	
19	3.06	579	93.39	37.25	-	37.75	116	8.92	717	55.11	
13	2.10	592	95.48	37.75	-	38.25	105	8.07	822	63.18	
12	1.94	604	97.42	38.25	-	38.75	96	7.38	918	70.56	
7	1.13	611	98.55	38.75	-	39.25	87	6.69	1005	77.25	
4	0.65	615	99.19	39.25	-	39.75	75	5.76	1080	83.01	
3	0.48	618	99.68	39.75	-	40.25	47	3.61	1127	86.63	
1	0.16	619	99.84	40.25	-	40.75	49	3.77	1176	90.39	
0	0.00	619	99.84	40.75	-	41.25	47	3.61	1223	94.00	
1	0.16	620	100.00	41.25	-	41.75	25	1.92	1248	95.93	
				41.75	-	42.25	18	1.38	1266	97.31	
				42.25	-	42.75	12	0.92	1278	98.23	
				42.75	-	43.25	10	0.77	1288	99.00	
				43.25	-	43.75	6	0.46	1294	99.46	
				43.75	-	44.25	2	0.15	1296	99.62	
				44.25	-	44.75	0	0.00	1296	99.62	
				44.75	-	45.25	4	0.31	1300	99.92	
				45.25	-	45.75	1	0.08	1301	100.00	

(D29) THIGH LINK

The vertical distance between the trochanterion landmark and the lateral femoral epicondyle landmark is calculated as follows: TROCHANTERION HEIGHT minus LATERAL FEMORAL EPICONDYLE HEIGHT.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
34.44	13.56	1ST	36.30	14.29
35.24	13.88	2ND	36.90	14.53
35.66	14.05	3RD	37.20	14.65
36.11	14.21	5TH	37.70	14.84
36.71	14.45	10TH	38.72	15.25
37.22	14.66	15TH	39.30	15.47
37.52	14.77	20TH	39.80	15.67
38.00	14.96	25TH	40.30	15.87
38.30	15.08	30TH	40.60	15.98
38.70	15.24	35TH	41.00	16.14
39.00	15.35	40TH	41.30	16.26
39.30	15.47	45TH	41.70	16.42
39.60	15.59	50TH	42.00	16.54
39.90	15.71	55TH	42.30	16.65
40.20	15.83	60TH	42.70	16.81
40.50	15.94	65TH	43.00	16.93
40.80	16.06	70TH	43.40	17.09
41.20	16.22	75TH	43.90	17.28
41.60	16.38	80TH	44.40	17.48
41.90	16.50	85TH	44.90	17.68
42.70	16.81	90TH	45.60	17.95
43.60	17.17	95TH	46.60	18.35
44.14	17.37	97TH	47.10	18.54
44.80	17.64	98TH	47.80	18.82
45.76	18.01	99TH	48.70	19.17

(D29) THIGH LINK

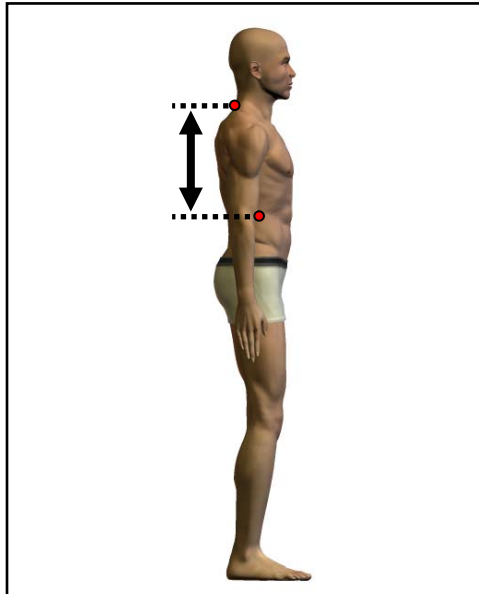
FEMALES		
CM		IN
39.64	MEAN	15.61
0.09	STD. ERROR (MEAN)	0.04
2.33	STANDARD DEVIATION	0.92
0.07	STD. ERROR (STD.DEV)	0.03
32.90	MINIMUM	12.95
47.70	MAXIMUM	18.78
SKEWNESS		0.22
KURTOSIS		3.13
COEFFICIENT OF VARIATION		5.9%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
42.08	MEAN	16.57
0.07	STD. ERROR (MEAN)	0.03
2.68	STANDARD DEVIATION	1.05
0.05	STD. ERROR (STD.DEV)	0.02
32.00	MINIMUM	12.60
54.20	MAXIMUM	21.34
SKEWNESS		0.18
KURTOSIS		3.23
COEFFICIENT OF VARIATION		6.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				F	FPct	CumF	CumFPct
				31.75	-	32.25		1	0.08	1	0.08
				32.25	-	32.75		0	0.00	1	0.08
				32.75	-	33.25		0	0.00	1	0.08
1	0.16	1	0.16	33.25	-	33.75		0	0.00	1	0.08
3	0.48	4	0.65	33.75	-	34.25		0	0.00	1	0.08
1	0.16	5	0.81	34.25	-	34.75		1	0.08	2	0.15
2	0.32	7	1.13	34.75	-	35.25		2	0.15	4	0.31
5	0.81	12	1.94	35.25	-	35.75		1	0.08	5	0.38
8	1.29	20	3.23	35.75	-	36.25		7	0.54	12	0.92
17	2.74	37	5.97	36.25	-	36.75		10	0.77	22	1.69
25	4.03	62	10.00	36.75	-	37.25		19	1.46	41	3.15
31	5.00	93	15.00	37.25	-	37.75		28	2.15	69	5.30
46	7.42	139	22.42	37.75	-	38.25		20	1.54	89	6.84
38	6.13	177	28.55	38.25	-	38.75		41	3.15	130	9.99
42	6.77	219	35.32	38.75	-	39.25		58	4.46	188	14.45
59	9.52	278	44.84	39.25	-	39.75		68	5.23	256	19.68
49	7.90	327	52.74	39.75	-	40.25		67	5.15	323	24.83
54	8.71	381	61.45	40.25	-	40.75		90	6.92	413	31.74
52	8.39	433	69.84	40.75	-	41.25		90	6.92	503	38.66
34	5.48	467	75.32	41.25	-	41.75		87	6.69	590	45.35
48	7.74	515	83.06	41.75	-	42.25		106	8.15	696	53.50
28	4.52	543	87.58	42.25	-	42.75		111	8.53	807	62.03
17	2.74	560	90.32	42.75	-	43.25		85	6.53	892	68.56
20	3.23	580	93.55	43.25	-	43.75		72	5.53	964	74.10
12	1.94	592	95.48	43.75	-	44.25		63	4.84	1027	78.94
12	1.94	604	97.42	44.25	-	44.75		62	4.77	1089	83.70
1	0.16	605	97.58	44.75	-	45.25		52	4.00	1141	87.70
8	1.29	613	98.87	45.25	-	45.75		40	3.07	1181	90.78
1	0.16	614	99.03	45.75	-	46.25		41	3.15	1222	93.93
2	0.32	616	99.35	46.25	-	46.75		21	1.61	1243	95.54
2	0.32	618	99.68	46.75	-	47.25		23	1.77	1266	97.31
1	0.16	619	99.84	47.25	-	47.75		9	0.69	1275	98.00
1	0.16	620	100.00	47.75	-	48.25		10	0.77	1285	98.77
				48.25	-	48.75		4	0.31	1289	99.08
				48.75	-	49.25		4	0.31	1293	99.39
				49.25	-	49.75		3	0.23	1296	99.62
				49.75	-	50.25		1	0.08	1297	99.69
				50.25	-	50.75		2	0.15	1299	99.85
				50.75	-	51.25		1	0.08	1300	99.92
				51.25	-	51.75		0	0.00	1300	99.92
				51.75	-	52.25		0	0.00	1300	99.92
				52.25	-	52.75		0	0.00	1300	99.92
				52.75	-	53.25		0	0.00	1300	99.92
				53.25	-	53.75		0	0.00	1300	99.92
				53.75	-	54.25		1	0.08	1301	100.00

(D30) THORAX LINK

The vertical distance between the cervicale landmark and tenth rib landmark is calculated as follows: CERVICALE HEIGHT minus TENTH RIB HEIGHT.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
30.80	12.13	1ST	35.50	13.98
31.10	12.24	2ND	35.90	14.13
31.40	12.36	3RD	36.30	14.29
31.71	12.48	5TH	36.80	14.49
32.50	12.80	10TH	37.50	14.76
33.02	13.00	15TH	38.00	14.96
33.50	13.19	20TH	38.30	15.08
33.70	13.27	25TH	38.60	15.20
34.10	13.43	30TH	38.90	15.31
34.34	13.51	35TH	39.10	15.39
34.60	13.62	40TH	39.40	15.51
34.95	13.76	45TH	39.60	15.59
35.20	13.86	50TH	39.90	15.71
35.50	13.98	55TH	40.10	15.79
35.70	14.06	60TH	40.40	15.91
35.97	14.16	65TH	40.70	16.02
36.20	14.25	70TH	40.90	16.10
36.60	14.41	75TH	41.20	16.22
36.98	14.56	80TH	41.50	16.34
37.40	14.72	85TH	41.90	16.50
38.00	14.96	90TH	42.48	16.72
38.70	15.24	95TH	43.20	17.01
39.60	15.59	97TH	43.80	17.24
40.26	15.85	98TH	44.20	17.40
40.68	16.01	99TH	44.70	17.60

(D30) THORAX LINK

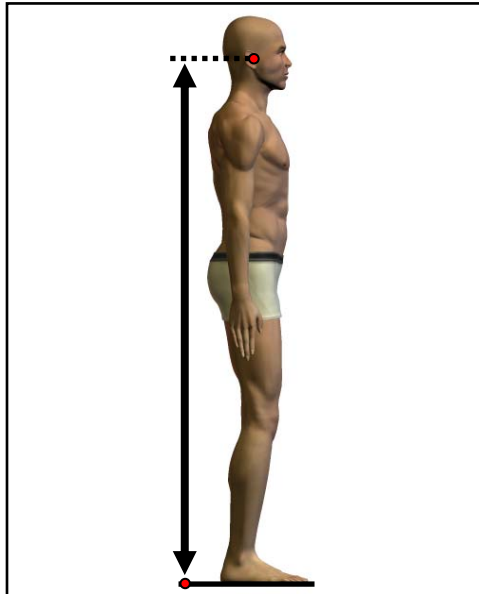
FEMALES		
<u>CM</u>		<u>IN</u>
35.23	MEAN	13.87
0.09	STD. ERROR (MEAN)	0.03
2.13	STANDARD DEVIATION	0.84
0.06	STD. ERROR (STD.DEV)	0.02
29.40	MINIMUM	11.57
42.50	MAXIMUM	16.73
SKEWNESS		0.27
KURTOSIS		3.10
COEFFICIENT OF VARIATION		6.0%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
39.94	MEAN	15.72
0.05	STD. ERROR (MEAN)	0.02
1.96	STANDARD DEVIATION	0.77
0.04	STD. ERROR (STD.DEV)	0.02
34.10	MINIMUM	13.43
49.90	MAXIMUM	19.65
SKEWNESS		0.20
KURTOSIS		3.39
COEFFICIENT OF VARIATION		4.9%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	29.25	-	29.75					
0	0.00	1	0.16	29.75	-	30.25					
4	0.65	5	0.81	30.25	-	30.75					
9	1.45	14	2.26	30.75	-	31.25					
17	2.74	31	5.00	31.25	-	31.75					
19	3.06	50	8.06	31.75	-	32.25					
22	3.55	72	11.61	32.25	-	32.75					
35	5.65	107	17.26	32.75	-	33.25					
51	8.23	158	25.48	33.25	-	33.75					
48	7.74	206	33.23	33.75	-	34.25		1	0.08	1	0.08
56	9.03	262	42.26	34.25	-	34.75		4	0.31	5	0.38
57	9.19	319	51.45	34.75	-	35.25		5	0.38	10	0.77
61	9.84	380	61.29	35.25	-	35.75		9	0.69	19	1.46
60	9.68	440	70.97	35.75	-	36.25		19	1.46	38	2.92
42	6.77	482	77.74	36.25	-	36.75		22	1.69	60	4.61
34	5.48	516	83.23	36.75	-	37.25		42	3.23	102	7.84
27	4.35	543	87.58	37.25	-	37.75		57	4.38	159	12.22
27	4.35	570	91.94	37.75	-	38.25		91	6.99	250	19.22
20	3.23	590	95.16	38.25	-	38.75		111	8.53	361	27.75
10	1.61	600	96.77	38.75	-	39.25		133	10.22	494	37.97
4	0.65	604	97.42	39.25	-	39.75		123	9.45	617	47.43
4	0.65	608	98.06	39.75	-	40.25		126	9.68	743	57.11
7	1.13	615	99.19	40.25	-	40.75		124	9.53	867	66.64
1	0.16	616	99.35	40.75	-	41.25		112	8.61	979	75.25
2	0.32	618	99.68	41.25	-	41.75		112	8.61	1091	83.86
1	0.16	619	99.84	41.75	-	42.25		61	4.69	1152	88.55
1	0.16	620	100.00	42.25	-	42.75		42	3.23	1194	91.78
				42.75	-	43.25		43	3.31	1237	95.08
				43.25	-	43.75		23	1.77	1260	96.85
				43.75	-	44.25		16	1.23	1276	98.08
				44.25	-	44.75		13	1.00	1289	99.08
				44.75	-	45.25		7	0.54	1296	99.62
				45.25	-	45.75		3	0.23	1299	99.85
				45.75	-	46.25		0	0.00	1299	99.85
				46.25	-	46.75		1	0.08	1300	99.92
				46.75	-	47.25		0	0.00	1300	99.92
				47.25	-	47.75		0	0.00	1300	99.92
				47.75	-	48.25		0	0.00	1300	99.92
				48.25	-	48.75		0	0.00	1300	99.92
				48.75	-	49.25		0	0.00	1300	99.92
				49.25	-	49.75		0	0.00	1300	99.92
				49.75	-	50.25		1	0.08	1301	100.00

(D31) TRAGION HEIGHT

The vertical distance between a standing surface and the tragon landmark of a participant standing erect with the head in the Frankfurt plane is calculated as follows: STATURE minus TRAGION-TOP OF HEAD.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
136.74	53.84	1ST	147.60	58.11
137.74	54.23	2ND	149.02	58.67
138.76	54.64	3RD	150.10	59.09
139.91	55.08	5TH	151.50	59.65
141.91	55.87	10TH	153.50	60.43
143.60	56.54	15TH	154.90	60.98
144.60	56.93	20TH	156.30	61.54
145.70	57.36	25TH	157.60	62.05
146.80	57.80	30TH	158.50	62.40
147.64	58.12	35TH	159.30	62.72
148.74	58.56	40TH	160.28	63.10
149.30	58.78	45TH	161.00	63.39
150.00	59.06	50TH	162.00	63.78
150.80	59.37	55TH	162.80	64.09
151.40	59.61	60TH	163.50	64.37
152.10	59.88	65TH	164.40	64.72
152.97	60.23	70TH	165.40	65.12
154.00	60.63	75TH	166.60	65.59
155.30	61.14	80TH	168.10	66.18
156.30	61.54	85TH	169.50	66.73
157.80	62.13	90TH	171.58	67.55
160.70	63.27	95TH	174.09	68.54
162.04	63.79	97TH	175.99	69.29
163.12	64.22	98TH	177.00	69.69
164.06	64.59	99TH	178.80	70.39

(D31) TRAGION HEIGHT

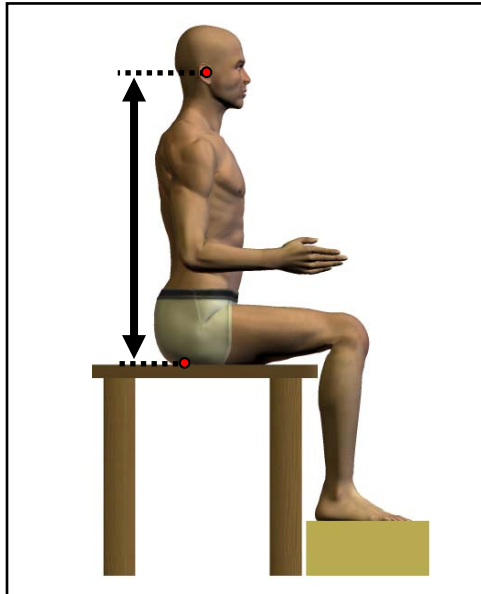
FEMALES		
CM		IN
150.03	MEAN	59.07
0.24	STD. ERROR (MEAN)	0.10
6.10	STANDARD DEVIATION	2.40
0.17	STD. ERROR (STD.DEV)	0.07
133.70	MINIMUM	52.64
167.60	MAXIMUM	65.98
SKEWNESS		0.09
KURTOSIS		2.79
COEFFICIENT OF VARIATION		4.1%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
162.19	MEAN	63.86
0.19	STD. ERROR (MEAN)	0.08
6.88	STANDARD DEVIATION	2.71
0.13	STD. ERROR (STD.DEV)	0.05
138.80	MINIMUM	54.65
183.90	MAXIMUM	72.40
SKEWNESS		0.19
KURTOSIS		2.91
COEFFICIENT OF VARIATION		4.2%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	132.25	-	133.75					
1	0.16	2	0.32	133.75	-	135.25					
4	0.65	6	0.97	135.25	-	136.75					
10	1.61	16	2.58	136.75	-	138.25					
9	1.45	25	4.03	138.25	-	139.75		1	0.08	1	0.08
23	3.71	48	7.74	139.75	-	141.25		0	0.00	1	0.08
29	4.68	77	12.42	141.25	-	142.75		0	0.00	1	0.08
35	5.65	112	18.06	142.75	-	144.25		4	0.31	5	0.38
44	7.10	156	25.16	144.25	-	145.75		0	0.00	5	0.38
48	7.74	204	32.90	145.75	-	147.25		6	0.46	11	0.85
44	7.10	248	40.00	147.25	-	148.75		12	0.92	23	1.77
71	11.45	319	51.45	148.75	-	150.25		20	1.54	43	3.31
66	10.65	385	62.10	150.25	-	151.75		29	2.23	72	5.53
59	9.52	444	71.61	151.75	-	153.25		47	3.61	119	9.15
39	6.29	483	77.90	153.25	-	154.75		70	5.38	189	14.53
42	6.77	525	84.68	154.75	-	156.25		64	4.92	253	19.45
31	5.00	556	89.68	156.25	-	157.75		82	6.30	335	25.75
19	3.06	575	92.74	157.75	-	159.25		118	9.07	453	34.82
16	2.58	591	95.32	159.25	-	160.75		108	8.30	561	43.12
13	2.10	604	97.42	160.75	-	162.25		115	8.84	676	51.96
9	1.45	613	98.87	162.25	-	163.75		123	9.45	799	61.41
3	0.48	616	99.35	163.75	-	165.25		99	7.61	898	69.02
2	0.32	618	99.68	165.25	-	166.75		87	6.69	985	75.71
2	0.32	620	100.00	166.75	-	168.25		65	5.00	1050	80.71
				168.25	-	169.75		66	5.07	1116	85.78
				169.75	-	171.25		44	3.38	1160	89.16
				171.25	-	172.75		47	3.61	1207	92.77
				172.75	-	174.25		34	2.61	1241	95.39
				174.25	-	175.75		20	1.54	1261	96.93
				175.75	-	177.25		16	1.23	1277	98.16
				177.25	-	178.75		11	0.85	1288	99.00
				178.75	-	180.25		6	0.46	1294	99.46
				180.25	-	181.75		3	0.23	1297	99.69
				181.75	-	183.25		3	0.23	1300	99.92
				183.25	-	184.75		1	0.08	1301	100.00

(D32) TRAGION HEIGHT, SITTING

The vertical distance between a sitting surface and the tragon landmark of a participant sitting erect with the head in the Frankfurt plane is calculated as follows: SITTING HEIGHT minus TRAGION-TOP OF HEAD.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
65.92	25.95	1ST	71.30	28.07
67.01	26.38	2ND	72.00	28.35
67.83	26.70	3RD	72.50	28.54
68.50	26.97	5TH	73.20	28.82
69.50	27.36	10TH	74.40	29.29
70.02	27.57	15TH	75.20	29.61
70.70	27.83	20TH	75.80	29.84
71.33	28.08	25TH	76.40	30.08
71.70	28.23	30TH	76.90	30.28
72.30	28.46	35TH	77.30	30.43
72.70	28.62	40TH	77.70	30.59
73.10	28.78	45TH	78.20	30.79
73.50	28.94	50TH	78.70	30.98
73.80	29.06	55TH	79.20	31.18
74.20	29.21	60TH	79.60	31.34
74.60	29.37	65TH	80.00	31.50
75.10	29.57	70TH	80.50	31.69
75.50	29.72	75TH	81.10	31.93
75.80	29.84	80TH	81.66	32.15
76.50	30.12	85TH	82.40	32.44
77.30	30.43	90TH	83.38	32.82
79.00	31.10	95TH	84.59	33.31
79.47	31.29	97TH	85.39	33.62
80.26	31.59	98TH	86.10	33.90
81.08	31.92	99TH	87.10	34.29

(D32) TRAGION HEIGHT, SITTING

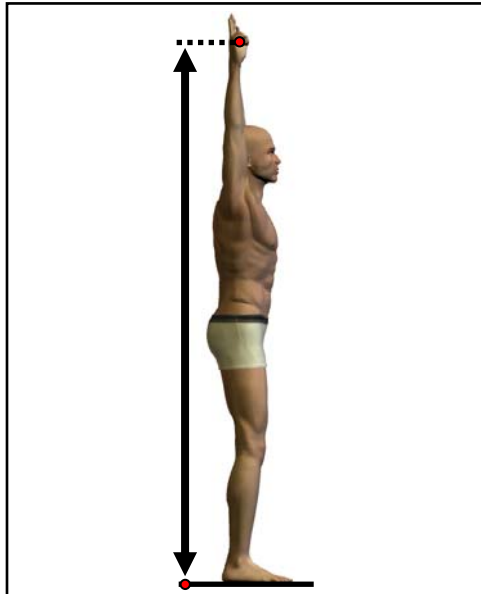
FEMALES		
CM		IN
73.44	MEAN	28.91
0.13	STD. ERROR (MEAN)	0.05
3.13	STANDARD DEVIATION	1.23
0.09	STD. ERROR (STD.DEV)	0.03
64.40	MINIMUM	25.35
82.80	MAXIMUM	32.60
SKEWNESS		0.09
KURTOSIS		3.03
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
78.76	MEAN	31.01
0.10	STD. ERROR (MEAN)	0.04
3.44	STANDARD DEVIATION	1.36
0.07	STD. ERROR (STD.DEV)	0.03
68.60	MINIMUM	27.01
91.30	MAXIMUM	35.94
SKEWNESS		0.15
KURTOSIS		2.93
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
1	0.16	1	0.16	63.55	-	64.55					
3	0.48	4	0.65	64.55	-	65.55					
5	0.81	9	1.45	65.55	-	66.55					
7	1.13	16	2.58	66.55	-	67.55					
18	2.90	34	5.48	67.55	-	68.55					
33	5.32	67	10.81	68.55	-	69.55		2	0.15	2	0.15
46	7.42	113	18.23	69.55	-	70.55		5	0.38	7	0.54
55	8.87	168	27.10	70.55	-	71.55		9	0.69	16	1.23
63	10.16	231	37.26	71.55	-	72.55		24	1.84	40	3.07
85	13.71	316	50.97	72.55	-	73.55		42	3.23	82	6.30
84	13.55	400	64.52	73.55	-	74.55		63	4.84	145	11.15
71	11.45	471	75.97	74.55	-	75.55		80	6.15	225	17.29
57	9.19	528	85.16	75.55	-	76.55		113	8.69	338	25.98
36	5.81	564	90.97	76.55	-	77.55		153	11.76	491	37.74
17	2.74	581	93.71	77.55	-	78.55		146	11.22	637	48.96
21	3.39	602	97.10	78.55	-	79.55		139	10.68	776	59.65
7	1.13	609	98.23	79.55	-	80.55		153	11.76	929	71.41
7	1.13	616	99.35	80.55	-	81.55		99	7.61	1028	79.02
3	0.48	619	99.84	81.55	-	82.55		83	6.38	1111	85.40
1	0.16	620	100.00	82.55	-	83.55		76	5.84	1187	91.24
				83.55	-	84.55		49	3.77	1236	95.00
				84.55	-	85.55		30	2.31	1266	97.31
				85.55	-	86.55		17	1.31	1283	98.62
				86.55	-	87.55		11	0.85	1294	99.46
				87.55	-	88.55		2	0.15	1296	99.62
				88.55	-	89.55		2	0.15	1298	99.77
				89.55	-	90.55		2	0.15	1300	99.92
				90.55	-	91.55		1	0.08	1301	100.00

(D33) VERTICAL GRIP REACH

The vertical distance between a standing surface and the center of a 1-1/4-in-diameter dowel gripped horizontally in the right hand of a participant standing erect with the shoulder, arm, and hand held straight overhead is calculated as follows: OVERHEAD FINGERTIP REACH SITTING plus (STATURE minus SITTING HEIGHT) minus ANSUR mean of HAND LENGTH plus ANSUR mean of WRIST-CENTER OF GRIP LENGTH.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
179.40	70.63	1ST	193.90	76.34
180.43	71.03	2ND	196.91	77.52
181.71	71.54	3RD	198.40	78.11
183.10	72.09	5TH	200.10	78.78
185.79	73.15	10TH	202.92	79.89
188.20	74.09	15TH	204.90	80.67
190.00	74.80	20TH	207.30	81.61
192.08	75.62	25TH	208.90	82.24
193.50	76.18	30TH	210.20	82.76
194.70	76.65	35TH	211.60	83.31
196.10	77.20	40TH	212.70	83.74
197.26	77.66	45TH	214.10	84.29
198.40	78.11	50TH	215.30	84.76
199.65	78.60	55TH	216.41	85.20
200.94	79.11	60TH	217.72	85.72
201.94	79.50	65TH	219.10	86.26
203.20	80.00	70TH	220.80	86.93
204.30	80.43	75TH	222.50	87.60
206.22	81.19	80TH	224.50	88.39
207.60	81.73	85TH	226.80	89.29
210.11	82.72	90TH	229.40	90.31
213.31	83.98	95TH	233.30	91.85
215.84	84.98	97TH	235.09	92.56
217.31	85.55	98TH	237.50	93.50
222.00	87.40	99TH	239.59	94.33

(D33) VERTICAL GRIP REACH

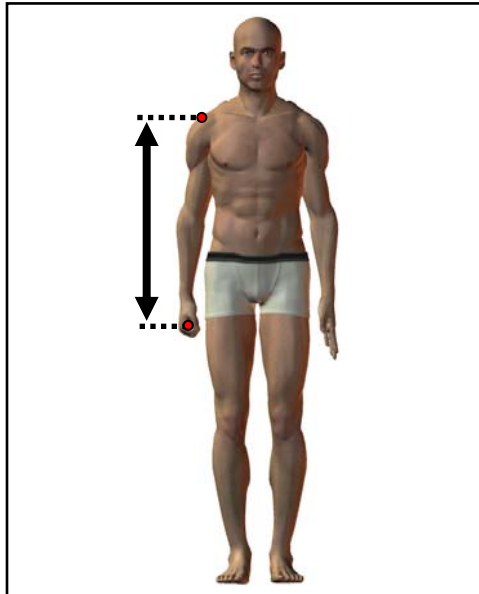
FEMALES		
CM		IN
198.33	MEAN	78.08
0.37	STD. ERROR (MEAN)	0.15
9.17	STANDARD DEVIATION	3.61
0.26	STD. ERROR (STD.DEV)	0.10
177.80	MINIMUM	70.00
227.00	MAXIMUM	89.37
SKEWNESS		0.11
KURTOSIS		2.75
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		618

MALES		
CM		IN
215.80	MEAN	84.96
0.28	STD. ERROR (MEAN)	0.11
10.06	STANDARD DEVIATION	3.96
0.20	STD. ERROR (STD.DEV)	0.08
183.60	MINIMUM	72.28
245.90	MAXIMUM	96.81
SKEWNESS		0.17
KURTOSIS		2.78
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
8	1.29	8	1.29	177.55	-	179.55					
9	1.46	17	2.75	179.55	-	181.55					
20	3.24	37	5.99	181.55	-	183.55					
23	3.72	60	9.71	183.55	-	185.55		1	0.08	1	0.08
25	4.05	85	13.75	185.55	-	187.55		0	0.00	1	0.08
27	4.37	112	18.12	187.55	-	189.55		3	0.23	4	0.31
34	5.50	146	23.62	189.55	-	191.55		1	0.08	5	0.38
40	6.47	186	30.10	191.55	-	193.55		5	0.38	10	0.77
52	8.41	238	38.51	193.55	-	195.55		7	0.54	17	1.31
47	7.61	285	46.12	195.55	-	197.55		13	1.00	30	2.31
53	8.58	338	54.69	197.55	-	199.55		24	1.84	54	4.15
54	8.74	392	63.43	199.55	-	201.55		39	3.00	93	7.15
47	7.61	439	71.04	201.55	-	203.55		57	4.38	150	11.53
46	7.44	485	78.48	203.55	-	205.55		64	4.92	214	16.45
40	6.47	525	84.95	205.55	-	207.55		55	4.23	269	20.68
26	4.21	551	89.16	207.55	-	209.55		83	6.38	352	27.06
21	3.40	572	92.56	209.55	-	211.55		101	7.76	453	34.82
19	3.07	591	95.63	211.55	-	213.55		101	7.76	554	42.58
8	1.29	599	96.93	213.55	-	215.55		107	8.22	661	50.81
8	1.29	607	98.22	215.55	-	217.55		106	8.15	767	58.95
2	0.32	609	98.54	217.55	-	219.55		101	7.76	868	66.72
2	0.32	611	98.87	219.55	-	221.55		69	5.30	937	72.02
5	0.81	616	99.68	221.55	-	223.55		71	5.46	1008	77.48
1	0.16	617	99.84	223.55	-	225.55		64	4.92	1072	82.40
1	0.16	618	100.00	225.55	-	227.55		55	4.23	1127	86.63
				227.55	-	229.55		49	3.77	1176	90.39
				229.55	-	231.55		32	2.46	1208	92.85
				231.55	-	233.55		30	2.31	1238	95.16
				233.55	-	235.55		26	2.00	1264	97.16
				235.55	-	237.55		12	0.92	1276	98.08
				237.55	-	239.55		12	0.92	1288	99.00
				239.55	-	241.55		8	0.61	1296	99.62
				241.55	-	243.55		1	0.08	1297	99.69
				243.55	-	245.55		3	0.23	1300	99.92
				245.55	-	247.55		1	0.08	1301	100.00

(D34) VERTICAL GRIP REACH DOWN

The vertical distance between the acromion right landmark and the center of a 1-1/4-in-diameter dowel gripped horizontally in the right hand of a participant standing erect with the arms held straight at the sides is calculated as follows: ACROMIAL HEIGHT minus WRIST HEIGHT plus ANSUR mean of WRIST-CENTER OF GRIP LENGTH.



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
54.82	21.58	1ST	59.40	23.39
55.50	21.85	2ND	60.60	23.86
55.73	21.94	3RD	61.00	24.02
56.41	22.20	5TH	61.61	24.25
57.30	22.56	10TH	62.70	24.69
58.00	22.83	15TH	63.50	25.00
58.60	23.07	20TH	64.00	25.20
59.03	23.24	25TH	64.40	25.35
59.30	23.35	30TH	64.90	25.55
59.80	23.54	35TH	65.40	25.75
60.10	23.66	40TH	65.70	25.87
60.50	23.82	45TH	66.10	26.02
60.80	23.94	50TH	66.50	26.18
61.16	24.08	55TH	67.00	26.38
61.70	24.29	60TH	67.30	26.50
62.00	24.41	65TH	67.70	26.65
62.40	24.57	70TH	68.10	26.81
62.80	24.72	75TH	68.70	27.05
63.30	24.92	80TH	69.20	27.24
63.80	25.12	85TH	69.80	27.48
64.50	25.39	90TH	70.60	27.80
65.60	25.83	95TH	72.10	28.39
66.20	26.06	97TH	72.90	28.70
66.86	26.32	98TH	73.30	28.86
68.12	26.82	99TH	74.40	29.29

(D34) VERTICAL GRIP REACH DOWN

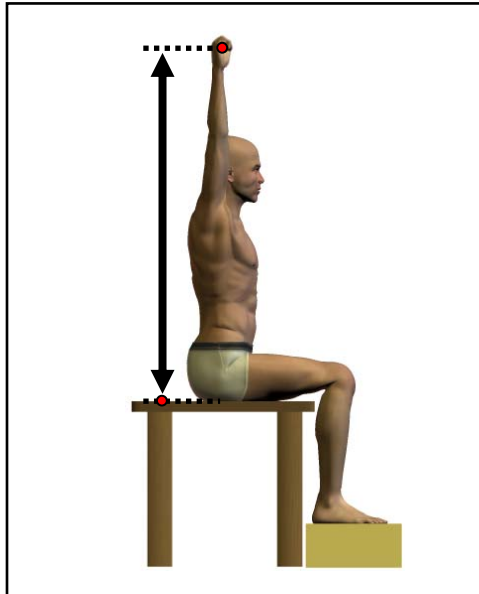
FEMALES		
CM		IN
60.92	MEAN	23.98
0.11	STD. ERROR (MEAN)	0.04
2.78	STANDARD DEVIATION	1.09
0.08	STD. ERROR (STD.DEV)	0.03
53.40	MINIMUM	21.02
69.30	MAXIMUM	27.28
SKEWNESS		0.14
KURTOSIS		2.95
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
66.61	MEAN	26.23
0.09	STD. ERROR (MEAN)	0.03
3.11	STANDARD DEVIATION	1.22
0.06	STD. ERROR (STD.DEV)	0.02
57.00	MINIMUM	22.44
76.70	MAXIMUM	30.20
SKEWNESS		0.15
KURTOSIS		3.04
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		1300

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
2	0.32	2	0.32	52.55	-	53.55					
1	0.16	3	0.48	53.55	-	54.55					
10	1.61	13	2.10	54.55	-	55.55					
19	3.06	32	5.16	55.55	-	56.55					
37	5.97	69	11.13	56.55	-	57.55		2	0.15	2	0.15
48	7.74	117	18.87	57.55	-	58.55		4	0.31	6	0.46
78	12.58	195	31.45	58.55	-	59.55		8	0.62	14	1.08
88	14.19	283	45.65	59.55	-	60.55		9	0.69	23	1.77
82	13.23	365	58.87	60.55	-	61.55		40	3.08	63	4.85
85	13.71	450	72.58	61.55	-	62.55		54	4.15	117	9.00
65	10.48	515	83.06	62.55	-	63.55		87	6.69	204	15.69
47	7.58	562	90.65	63.55	-	64.55		138	10.62	342	26.31
27	4.35	589	95.00	64.55	-	65.55		143	11.00	485	37.31
16	2.58	605	97.58	65.55	-	66.55		167	12.85	652	50.15
8	1.29	613	98.87	66.55	-	67.55		171	13.15	823	63.31
2	0.32	615	99.19	67.55	-	68.55		140	10.77	963	74.08
5	0.81	620	100.00	68.55	-	69.55		112	8.62	1075	82.69
				69.55	-	70.55		92	7.08	1167	89.77
				70.55	-	71.55		54	4.15	1221	93.92
				71.55	-	72.55		28	2.15	1249	96.08
				72.55	-	73.55		31	2.38	1280	98.46
				73.55	-	74.55		11	0.85	1291	99.31
				74.55	-	75.55		5	0.38	1296	99.69
				75.55	-	76.55		3	0.23	1299	99.92
				76.55	-	77.55		1	0.08	1300	100.00

(D35) VERTICAL GRIP REACH, SITTING

The vertical distance between a sitting surface and the center of a 1-1/4-in-diameter dowel gripped horizontally in the right hand of a participant sitting erect with the arm held straight overhead is calculated as follows: OVERHEAD FINGERTIP REACH SITTING minus ANSUR mean of HAND LENGTH plus ANSUR mean of WRIST-CENTER OF GRIP LENGTH.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
108.16	42.58	1ST	118.90	46.81
109.60	43.15	2ND	120.50	47.44
110.53	43.52	3RD	121.51	47.83
111.60	43.94	5TH	122.80	48.35
114.08	44.91	10TH	124.60	49.06
115.49	45.46	15TH	126.13	49.66
116.58	45.90	20TH	127.20	50.08
117.80	46.38	25TH	128.20	50.47
118.77	46.76	30TH	129.00	50.79
119.67	47.12	35TH	129.80	51.10
120.36	47.38	40TH	130.48	51.37
120.90	47.60	45TH	131.29	51.69
121.80	47.95	50TH	132.20	52.05
122.80	48.35	55TH	132.80	52.28
123.34	48.56	60TH	133.60	52.60
124.00	48.82	65TH	134.60	52.99
124.90	49.17	70TH	135.70	53.43
126.00	49.61	75TH	136.70	53.82
126.72	49.89	80TH	137.90	54.29
127.62	50.25	85TH	139.00	54.72
129.11	50.83	90TH	140.50	55.31
131.60	51.81	95TH	142.90	56.26
133.06	52.38	97TH	144.29	56.81
134.35	52.89	98TH	145.30	57.20
136.02	53.55	99TH	146.30	57.60

(D35) VERTICAL GRIP REACH, SITTING

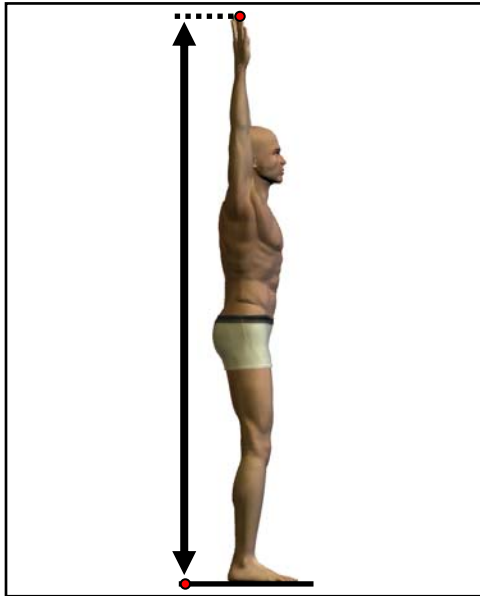
FEMALES		
CM		IN
121.75	MEAN	47.93
0.24	STD. ERROR (MEAN)	0.09
5.90	STANDARD DEVIATION	2.32
0.17	STD. ERROR (STD.DEV)	0.07
105.50	MINIMUM	41.54
137.30	MAXIMUM	54.06
SKEWNESS		-0.02
KURTOSIS		2.79
COEFFICIENT OF VARIATION		4.8%
NUMBER OF PARTICIPANTS		618

MALES		
CM		IN
132.37	MEAN	52.11
0.17	STD. ERROR (MEAN)	0.07
6.13	STANDARD DEVIATION	2.41
0.12	STD. ERROR (STD.DEV)	0.05
113.40	MINIMUM	44.65
150.70	MAXIMUM	59.33
SKEWNESS		0.09
KURTOSIS		2.75
COEFFICIENT OF VARIATION		4.6%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
F	FPct	CumF	CumFPct	CM				F	FPct	CumF	CumFPct
1	0.16	1	0.16	104.55	-	105.55					
1	0.16	2	0.32	105.55	-	106.55					
0	0.00	2	0.32	106.55	-	107.55					
5	0.81	7	1.13	107.55	-	108.55					
4	0.65	11	1.78	108.55	-	109.55					
7	1.13	18	2.91	109.55	-	110.55					
12	1.94	30	4.85	110.55	-	111.55					
15	2.43	45	7.28	111.55	-	112.55					
13	2.10	58	9.39	112.55	-	113.55		1	0.08	1	0.08
8	1.29	66	10.68	113.55	-	114.55		1	0.08	2	0.15
30	4.85	96	15.53	114.55	-	115.55		1	0.08	3	0.23
27	4.37	123	19.90	115.55	-	116.55		3	0.23	6	0.46
25	4.05	148	23.95	116.55	-	117.55		5	0.38	11	0.85
32	5.18	180	29.13	117.55	-	118.55		1	0.08	12	0.92
29	4.69	209	33.82	118.55	-	119.55		6	0.46	18	1.38
49	7.93	258	41.75	119.55	-	120.55		9	0.69	27	2.08
43	6.96	301	48.71	120.55	-	121.55		12	0.92	39	3.00
35	5.66	336	54.37	121.55	-	122.55		22	1.69	61	4.69
47	7.61	383	61.97	122.55	-	123.55		33	2.54	94	7.23
40	6.47	423	68.45	123.55	-	124.55		35	2.69	129	9.92
24	3.88	447	72.33	124.55	-	125.55		43	3.31	172	13.22
41	6.63	488	78.96	125.55	-	126.55		56	4.30	228	17.52
34	5.50	522	84.47	126.55	-	127.55		56	4.30	284	21.83
20	3.24	542	87.70	127.55	-	128.55		73	5.61	357	27.44
23	3.72	565	91.42	128.55	-	129.55		78	6.00	435	33.44
12	1.94	577	93.37	129.55	-	130.55		90	6.92	525	40.35
10	1.62	587	94.98	130.55	-	131.55		79	6.07	604	46.43
12	1.94	599	96.93	131.55	-	132.55		90	6.92	694	53.34
3	0.49	602	97.41	132.55	-	133.55		79	6.07	773	59.42
5	0.81	607	98.22	133.55	-	134.55		68	5.23	841	64.64
4	0.65	611	98.87	134.55	-	135.55		56	4.30	897	68.95
2	0.32	613	99.19	135.55	-	136.55		68	5.23	965	74.17
5	0.81	618	100.00	136.55	-	137.55		58	4.46	1023	78.63
				137.55	-	138.55		53	4.07	1076	82.71
				138.55	-	139.55		60	4.61	1136	87.32
				139.55	-	140.55		38	2.92	1174	90.24
				140.55	-	141.55		27	2.08	1201	92.31
				141.55	-	142.55		25	1.92	1226	94.24
				142.55	-	143.55		24	1.84	1250	96.08
				143.55	-	144.55		15	1.15	1265	97.23
				144.55	-	145.55		14	1.08	1279	98.31
				145.55	-	146.55		13	1.00	1292	99.31
				146.55	-	147.55		4	0.31	1296	99.62
				147.55	-	148.55		2	0.15	1298	99.77
				148.55	-	149.55		2	0.15	1300	99.92
				149.55	-	150.55		0	0.00	1300	99.92
				150.55	-	151.55		1	0.08	1301	100.00

(D36) VERTICAL INDEX FINGERTIP REACH

The vertical distance between a standing surface and the tip of the right index finger of a participant standing erect with the right shoulder, arm, and fingers stretched straight overhead is calculated as follows: OVERHEAD FINGERTIP REACH, SITTING plus (STATURE minus SITTING HEIGHT) minus (ANSUR mean of HAND LENGTH minus ANSUR mean of WRIST-INDEX FINGER LENGTH).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
189.70	74.69	1ST	205.00	80.71
190.73	75.09	2ND	208.01	81.89
192.01	75.60	3RD	209.50	82.48
193.40	76.14	5TH	211.20	83.15
196.09	77.20	10TH	214.02	84.26
198.50	78.15	15TH	216.00	85.04
200.30	78.86	20TH	218.40	85.98
202.38	79.68	25TH	220.00	86.61
203.80	80.24	30TH	221.30	87.13
205.00	80.71	35TH	222.70	87.68
206.40	81.26	40TH	223.80	88.11
207.56	81.71	45TH	225.20	88.66
208.70	82.17	50TH	226.40	89.13
209.95	82.66	55TH	227.51	89.57
211.24	83.17	60TH	228.82	90.09
212.24	83.55	65TH	230.20	90.63
213.50	84.06	70TH	231.90	91.30
214.60	84.49	75TH	233.60	91.97
216.52	85.25	80TH	235.60	92.76
217.90	85.79	85TH	237.90	93.66
220.41	86.77	90TH	240.50	94.69
223.61	88.03	95TH	244.40	96.22
226.14	89.04	97TH	246.19	96.93
227.61	89.61	98TH	248.60	97.87
232.30	91.46	99TH	250.69	98.70

(D36) VERTICAL INDEX FINGERTIP REACH

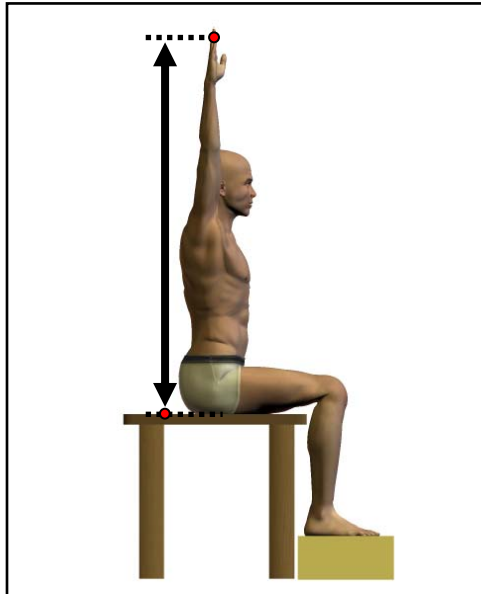
FEMALES		
CM		IN
208.63	MEAN	82.14
0.37	STD. ERROR (MEAN)	0.15
9.17	STANDARD DEVIATION	3.61
0.26	STD. ERROR (STD.DEV)	0.10
188.10	MINIMUM	74.06
237.30	MAXIMUM	93.43
SKEWNESS		0.11
KURTOSIS		2.75
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		618

MALES		
CM		IN
226.90	MEAN	89.33
0.28	STD. ERROR (MEAN)	0.11
10.06	STANDARD DEVIATION	3.96
0.20	STD. ERROR (STD.DEV)	0.08
194.70	MINIMUM	76.65
257.00	MAXIMUM	101.18
SKEWNESS		0.17
KURTOSIS		2.78
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
4	0.65	4	0.65	187.55	-	189.55					
11	1.78	15	2.43	189.55	-	191.55					
20	3.24	35	5.66	191.55	-	193.55					
21	3.40	56	9.06	193.55	-	195.55		1	0.08	1	0.08
23	3.72	79	12.78	195.55	-	197.55		0	0.00	1	0.08
27	4.37	106	17.15	197.55	-	199.55		0	0.00	1	0.08
36	5.83	142	22.98	199.55	-	201.55		4	0.31	5	0.38
38	6.15	180	29.13	201.55	-	203.55		1	0.08	6	0.46
48	7.77	228	36.89	203.55	-	205.55		9	0.69	15	1.15
50	8.09	278	44.98	205.55	-	207.55		7	0.54	22	1.69
56	9.06	334	54.05	207.55	-	209.55		18	1.38	40	3.07
49	7.93	383	61.97	209.55	-	211.55		33	2.54	73	5.61
51	8.25	434	70.23	211.55	-	213.55		45	3.46	118	9.07
48	7.77	482	77.99	213.55	-	215.55		66	5.07	184	14.14
38	6.15	520	84.14	215.55	-	217.55		53	4.07	237	18.22
28	4.53	548	88.67	217.55	-	219.55		67	5.15	304	23.37
23	3.72	571	92.39	219.55	-	221.55		94	7.23	398	30.59
16	2.59	587	94.98	221.55	-	223.55		98	7.53	496	38.12
11	1.78	598	96.76	223.55	-	225.55		104	7.99	600	46.12
8	1.29	606	98.06	225.55	-	227.55		116	8.92	716	55.03
2	0.32	608	98.38	227.55	-	229.55		97	7.46	813	62.49
3	0.49	611	98.87	229.55	-	231.55		83	6.38	896	68.87
5	0.81	616	99.68	231.55	-	233.55		77	5.92	973	74.79
1	0.16	617	99.84	233.55	-	235.55		67	5.15	1040	79.94
1	0.16	618	100.00	235.55	-	237.55		59	4.53	1099	84.47
				237.55	-	239.55		49	3.77	1148	88.24
				239.55	-	241.55		43	3.31	1191	91.54
				241.55	-	243.55		31	2.38	1222	93.93
				243.55	-	245.55		31	2.38	1253	96.31
				245.55	-	247.55		19	1.46	1272	97.77
				247.55	-	249.55		7	0.54	1279	98.31
				249.55	-	251.55		14	1.08	1293	99.39
				251.55	-	253.55		3	0.23	1296	99.62
				253.55	-	255.55		3	0.23	1299	99.85
				255.55	-	257.55		2	0.15	1301	100.00

(D37) VERTICAL INDEX FINGERTIP REACH, SITTING

The vertical distance between a sitting surface and the tip of the right index finger of a participant sitting erect and raising the right shoulder, arm, and fingers straight overhead is calculated as follows: OVERHEAD FINGERTIP REACH SITTING minus ANSUR mean of HAND LENGTH plus ANSUR mean of WRIST-INDEX FINGER LENGTH.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
118.46	46.63	1ST	130.00	51.18
119.90	47.20	2ND	131.60	51.81
120.83	47.57	3RD	132.61	52.20
121.90	47.99	5TH	133.90	52.72
124.38	48.97	10TH	135.70	53.43
125.79	49.52	15TH	137.23	54.03
126.88	49.95	20TH	138.30	54.45
128.10	50.43	25TH	139.30	54.84
129.07	50.82	30TH	140.10	55.16
129.97	51.17	35TH	140.90	55.47
130.66	51.44	40TH	141.58	55.74
131.20	51.65	45TH	142.39	56.06
132.10	52.01	50TH	143.30	56.42
133.10	52.40	55TH	143.90	56.65
133.64	52.62	60TH	144.70	56.97
134.30	52.87	65TH	145.70	57.36
135.20	53.23	70TH	146.80	57.80
136.30	53.66	75TH	147.80	58.19
137.02	53.95	80TH	149.00	58.66
137.92	54.30	85TH	150.10	59.09
139.41	54.88	90TH	151.60	59.69
141.90	55.87	95TH	154.00	60.63
143.36	56.44	97TH	155.39	61.18
144.65	56.95	98TH	156.40	61.57
146.32	57.61	99TH	157.40	61.97

(D37) VERTICAL INDEX FINGERTIP REACH, SITTING

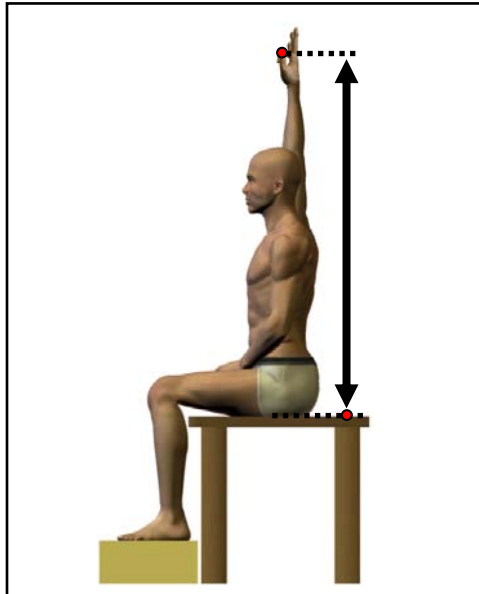
FEMALES		
CM		IN
132.05	MEAN	51.99
0.24	STD. ERROR (MEAN)	0.09
5.90	STANDARD DEVIATION	2.32
0.17	STD. ERROR (STD.DEV)	0.07
115.80	MINIMUM	45.59
147.60	MAXIMUM	58.11
SKEWNESS		-0.02
KURTOSIS		2.79
COEFFICIENT OF VARIATION		4.5%
NUMBER OF PARTICIPANTS		618

MALES		
CM		IN
143.47	MEAN	56.48
0.17	STD. ERROR (MEAN)	0.07
6.13	STANDARD DEVIATION	2.41
0.12	STD. ERROR (STD.DEV)	0.05
124.50	MINIMUM	49.02
161.80	MAXIMUM	63.70
SKEWNESS		0.09
KURTOSIS		2.75
COEFFICIENT OF VARIATION		4.3%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM		CM		E	FPct	CumF	CumFPct
2	0.32	2	0.32	115.25	-	116.75					
3	0.49	5	0.81	116.75	-	118.25					
5	0.81	10	1.62	118.25	-	119.75					
13	2.10	23	3.72	119.75	-	121.25					
22	3.56	45	7.28	121.25	-	122.75					
16	2.59	61	9.87	122.75	-	124.25					
31	5.02	92	14.89	124.25	-	125.75		2	0.15	2	0.15
38	6.15	130	21.04	125.75	-	127.25		2	0.15	4	0.31
49	7.93	179	28.96	127.25	-	128.75		7	0.54	11	0.85
47	7.61	226	36.57	128.75	-	130.25		5	0.38	16	1.23
70	11.33	296	47.90	130.25	-	131.75		11	0.85	27	2.08
54	8.74	350	56.63	131.75	-	133.25		24	1.84	51	3.92
69	11.17	419	67.80	133.25	-	134.75		45	3.46	96	7.38
43	6.96	462	74.76	134.75	-	136.25		58	4.46	154	11.84
55	8.90	517	83.66	136.25	-	137.75		83	6.38	237	18.22
38	6.15	555	89.81	137.75	-	139.25		87	6.69	324	24.90
21	3.40	576	93.20	139.25	-	140.75		124	9.53	448	34.44
17	2.75	593	95.95	140.75	-	142.25		127	9.76	575	44.20
9	1.46	602	97.41	142.25	-	143.75		132	10.15	707	54.34
7	1.13	609	98.54	143.75	-	145.25		114	8.76	821	63.11
4	0.65	613	99.19	145.25	-	146.75		86	6.61	907	69.72
5	0.81	618	100.00	146.75	-	148.25		87	6.69	994	76.40
				148.25	-	149.75		91	6.99	1085	83.40
				149.75	-	151.25		75	5.76	1160	89.16
				151.25	-	152.75		43	3.31	1203	92.47
				152.75	-	154.25		41	3.15	1244	95.62
				154.25	-	155.75		23	1.77	1267	97.39
				155.75	-	157.25		20	1.54	1287	98.92
				157.25	-	158.75		9	0.69	1296	99.62
				158.75	-	160.25		4	0.31	1300	99.92
				160.25	-	161.75		0	0.00	1300	99.92
				161.75	-	163.25		1	0.08	1301	100.00

(D38) VERTICAL THUMB TIP REACH, SITTING

The vertical distance between a sitting surface and the tip of the right thumb of a participant sitting erect with the right shoulder, arm, and hand held straight overhead with the thumb lying on the first knuckle of the index finger is calculated as follows: OVERHEAD FINGERTIP REACH SITTING minus ANSUR mean of HAND LENGTH plus ANSUR mean of WRIST-THUMB TIP LENGTH.



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
113.26	44.59	1ST	124.40	48.98
114.70	45.16	2ND	126.00	49.61
115.63	45.52	3RD	127.01	50.00
116.70	45.94	5TH	128.30	50.51
119.18	46.92	10TH	130.10	51.22
120.59	47.47	15TH	131.63	51.82
121.68	47.90	20TH	132.70	52.24
122.90	48.39	25TH	133.70	52.64
123.87	48.77	30TH	134.50	52.95
124.77	49.12	35TH	135.30	53.27
125.46	49.39	40TH	135.98	53.53
126.00	49.61	45TH	136.79	53.86
126.90	49.96	50TH	137.70	54.21
127.90	50.35	55TH	138.30	54.45
128.44	50.57	60TH	139.10	54.76
129.10	50.83	65TH	140.10	55.16
130.00	51.18	70TH	141.20	55.59
131.10	51.61	75TH	142.20	55.98
131.82	51.90	80TH	143.40	56.46
132.72	52.25	85TH	144.50	56.89
134.21	52.83	90TH	146.00	57.48
136.70	53.82	95TH	148.40	58.43
138.16	54.39	97TH	149.79	58.98
139.45	54.90	98TH	150.80	59.37
141.12	55.56	99TH	151.80	59.76

(D38) VERTICAL THUMB TIP REACH, SITTING

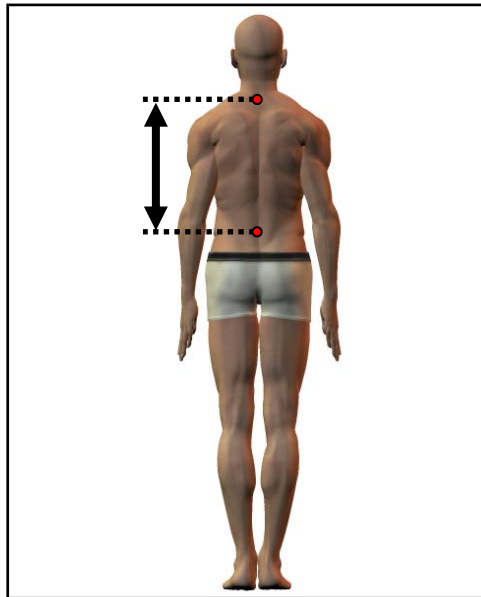
FEMALES		
CM		IN
126.85	MEAN	49.94
0.24	STD. ERROR (MEAN)	0.09
5.90	STANDARD DEVIATION	2.32
0.17	STD. ERROR (STD.DEV)	0.07
110.60	MINIMUM	43.54
142.40	MAXIMUM	56.06
SKEWNESS		-0.02
KURTOSIS		2.79
COEFFICIENT OF VARIATION		4.7%
NUMBER OF PARTICIPANTS		618

MALES		
CM		IN
137.87	MEAN	54.28
0.17	STD. ERROR (MEAN)	0.07
6.13	STANDARD DEVIATION	2.41
0.12	STD. ERROR (STD.DEV)	0.05
118.90	MINIMUM	46.81
156.20	MAXIMUM	61.50
SKEWNESS		0.09
KURTOSIS		2.75
COEFFICIENT OF VARIATION		4.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
2	0.32	2	0.32	110.55	-	111.55					
0	0.00	2	0.32	111.55	-	112.55					
5	0.81	7	1.13	112.55	-	113.55					
3	0.49	10	1.62	113.55	-	114.55					
8	1.29	18	2.91	114.55	-	115.55					
11	1.78	29	4.69	115.55	-	116.55					
16	2.59	45	7.28	116.55	-	117.55					
11	1.78	56	9.06	117.55	-	118.55					
8	1.29	64	10.36	118.55	-	119.55		1	0.08	1	0.08
28	4.53	92	14.89	119.55	-	120.55		1	0.08	2	0.15
28	4.53	120	19.42	120.55	-	121.55		2	0.15	4	0.31
26	4.21	146	23.62	121.55	-	122.55		5	0.38	9	0.69
33	5.34	179	28.96	122.55	-	123.55		2	0.15	11	0.85
29	4.69	208	33.66	123.55	-	124.55		4	0.31	15	1.15
45	7.28	253	40.94	124.55	-	125.55		7	0.54	22	1.69
43	6.96	296	47.90	125.55	-	126.55		10	0.77	32	2.46
37	5.99	333	53.88	126.55	-	127.55		17	1.31	49	3.77
42	6.80	375	60.68	127.55	-	128.55		29	2.23	78	6.00
44	7.12	419	67.80	128.55	-	129.55		33	2.54	111	8.53
27	4.37	446	72.17	129.55	-	130.55		36	2.77	147	11.30
38	6.15	484	78.32	130.55	-	131.55		44	3.38	191	14.68
33	5.34	517	83.66	131.55	-	132.55		64	4.92	255	19.60
24	3.88	541	87.54	132.55	-	133.55		62	4.77	317	24.37
20	3.24	561	90.78	133.55	-	134.55		76	5.84	393	30.21
15	2.43	576	93.20	134.55	-	135.55		83	6.38	476	36.59
10	1.62	586	94.82	135.55	-	136.55		90	6.92	566	43.50
13	2.10	599	96.93	136.55	-	137.55		77	5.92	643	49.42
3	0.49	602	97.41	137.55	-	138.55		95	7.30	738	56.73
4	0.65	606	98.06	138.55	-	139.55		76	5.84	814	62.57
5	0.81	611	98.87	139.55	-	140.55		61	4.69	875	67.26
2	0.32	613	99.19	140.55	-	141.55		57	4.38	932	71.64
5	0.81	618	100.00	141.55	-	142.55		60	4.61	992	76.25
				142.55	-	143.55		55	4.23	1047	80.48
				143.55	-	144.55		62	4.77	1109	85.24
				144.55	-	145.55		48	3.69	1157	88.93
				145.55	-	146.55		31	2.38	1188	91.31
				146.55	-	147.55		30	2.31	1218	93.62
				147.55	-	148.55		23	1.77	1241	95.39
				148.55	-	149.55		18	1.38	1259	96.77
				149.55	-	150.55		12	0.92	1271	97.69
				150.55	-	151.55		15	1.15	1286	98.85
				151.55	-	152.55		9	0.69	1295	99.54
				152.55	-	153.55		2	0.15	1297	99.69
				153.55	-	154.55		3	0.23	1300	99.92
				154.55	-	155.55		0	0.00	1300	99.92
				155.55	-	156.55		1	0.08	1301	100.00

(D39) WAIST BACK, VERTICAL (OMPHALION)*

The vertical distance between the cervicale landmark and the waist at the level of the navel (omphalion) is calculated as follows: CERVICALE HEIGHT minus WAIST HEIGHT (OMPHALION).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
36.30	14.29	1ST	39.60	15.59
36.90	14.53	2ND	40.20	15.83
37.20	14.65	3RD	40.60	15.98
37.60	14.80	5TH	41.11	16.18
38.40	15.12	10TH	42.12	16.58
38.70	15.24	15TH	42.70	16.81
39.20	15.43	20TH	43.10	16.97
39.60	15.59	25TH	43.40	17.09
40.00	15.75	30TH	43.80	17.24
40.30	15.87	35TH	44.10	17.36
40.60	15.98	40TH	44.50	17.52
40.80	16.06	45TH	44.80	17.64
41.10	16.18	50TH	45.00	17.72
41.40	16.30	55TH	45.40	17.87
41.70	16.42	60TH	45.70	17.99
41.97	16.53	65TH	46.00	18.11
42.30	16.65	70TH	46.40	18.27
42.60	16.77	75TH	46.70	18.39
43.08	16.96	80TH	47.10	18.54
43.60	17.17	85TH	47.60	18.74
44.29	17.44	90TH	48.18	18.97
45.20	17.80	95TH	49.20	19.37
45.80	18.03	97TH	50.09	19.72
46.00	18.11	98TH	50.60	19.92
46.74	18.40	99TH	51.30	20.20

* In ANSUR cervicale was defined as the highest point on the seventh cervical vertebra. For consistency with international standards, it is now the most prominent point on the seventh cervical vertebra.

(D39) WAIST BACK, VERTICAL (OMPHALION)

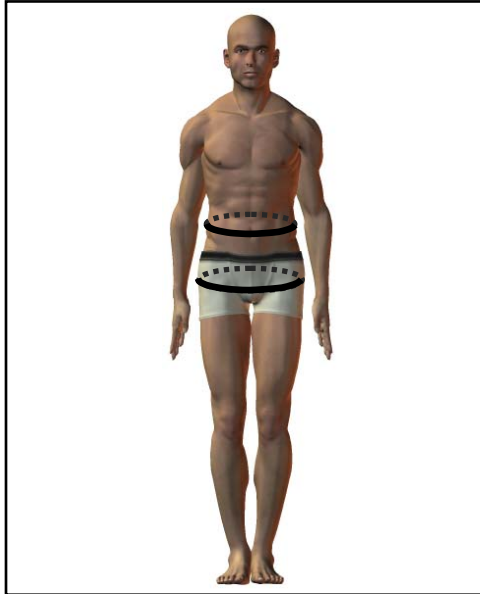
FEMALES		
<u>CM</u>		<u>IN</u>
41.20	MEAN	16.22
0.09	STD. ERROR (MEAN)	0.04
2.28	STANDARD DEVIATION	0.90
0.06	STD. ERROR (STD.DEV)	0.03
35.10	MINIMUM	13.82
49.80	MAXIMUM	19.61
SKEWNESS		0.30
KURTOSIS		3.16
COEFFICIENT OF VARIATION		5.5%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
45.13	MEAN	17.77
0.07	STD. ERROR (MEAN)	0.03
2.44	STANDARD DEVIATION	0.96
0.05	STD. ERROR (STD.DEV)	0.02
37.30	MINIMUM	14.69
56.70	MAXIMUM	22.32
SKEWNESS		0.23
KURTOSIS		3.39
COEFFICIENT OF VARIATION		5.4%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	34.75	-	35.25					
0	0.00	1	0.16	35.25	-	35.75					
4	0.65	5	0.81	35.75	-	36.25					
4	0.65	9	1.45	36.25	-	36.75					
11	1.77	20	3.23	36.75	-	37.25					
17	2.74	37	5.97	37.25	-	37.75		1	0.08	1	0.08
13	2.10	50	8.06	37.75	-	38.25		0	0.00	1	0.08
46	7.42	96	15.48	38.25	-	38.75		2	0.15	3	0.23
36	5.81	132	21.29	38.75	-	39.25		2	0.15	5	0.38
36	5.81	168	27.10	39.25	-	39.75		10	0.77	15	1.15
47	7.58	215	34.68	39.75	-	40.25		13	1.00	28	2.15
55	8.87	270	43.55	40.25	-	40.75		19	1.46	47	3.61
53	8.55	323	52.10	40.75	-	41.25		20	1.54	67	5.15
55	8.87	378	60.97	41.25	-	41.75		25	1.92	92	7.07
55	8.87	433	69.84	41.75	-	42.25		47	3.61	139	10.68
41	6.61	474	76.45	42.25	-	42.75		67	5.15	206	15.83
31	5.00	505	81.45	42.75	-	43.25		87	6.69	293	22.52
32	5.16	537	86.61	43.25	-	43.75		81	6.23	374	28.75
21	3.39	558	90.00	43.75	-	44.25		107	8.22	481	36.97
18	2.90	576	92.90	44.25	-	44.75		94	7.23	575	44.20
15	2.42	591	95.32	44.75	-	45.25		117	8.99	692	53.19
10	1.61	601	96.94	45.25	-	45.75		107	8.22	799	61.41
10	1.61	611	98.55	45.75	-	46.25		92	7.07	891	68.49
3	0.48	614	99.03	46.25	-	46.75		94	7.23	985	75.71
1	0.16	615	99.19	46.75	-	47.25		74	5.69	1059	81.40
2	0.32	617	99.52	47.25	-	47.75		62	4.77	1121	86.16
0	0.00	617	99.52	47.75	-	48.25		57	4.38	1178	90.55
1	0.16	618	99.68	48.25	-	48.75		37	2.84	1215	93.39
0	0.00	618	99.68	48.75	-	49.25		22	1.69	1237	95.08
1	0.16	619	99.84	49.25	-	49.75		18	1.38	1255	96.46
1	0.16	620	100.00	49.75	-	50.25		11	0.85	1266	97.31
				50.25	-	50.75		13	1.00	1279	98.31
				50.75	-	51.25		8	0.61	1287	98.92
				51.25	-	51.75		7	0.54	1294	99.46
				51.75	-	52.25		3	0.23	1297	99.69
				52.25	-	52.75		2	0.15	1299	99.85
				52.75	-	53.25		0	0.00	1299	99.85
				53.25	-	53.75		1	0.08	1300	99.92
				53.75	-	54.25		0	0.00	1300	99.92
				54.25	-	54.75		0	0.00	1300	99.92
				54.75	-	55.25		0	0.00	1300	99.92
				55.25	-	55.75		0	0.00	1300	99.92
				55.75	-	56.25		0	0.00	1300	99.92
				56.25	-	56.75		1	0.08	1301	100.00

(D40) WAIST-BUTTOCK DROP (OMPHALION)

The difference between the circumference of the waist at the level of the navel (omphalion) and the circumference at the level of the buttock point landmarks is calculated as follows: BUTTOCK CIRCUMFERENCE minus WAIST CIRCUMFERENCE (OMPHALION).



PERCENTILES				
FEMALES			MALES	
<u>CM</u>	<u>IN</u>		<u>CM</u>	<u>IN</u>
3.68	1.45	1ST	-0.10	-0.04
4.87	1.92	2ND	1.60	0.63
6.23	2.45	3RD	2.81	1.10
8.10	3.19	5TH	4.10	1.61
9.51	3.74	10TH	5.82	2.29
11.00	4.33	15TH	7.10	2.80
12.20	4.80	20TH	8.30	3.27
13.10	5.16	25TH	9.30	3.66
13.83	5.44	30TH	10.10	3.98
14.60	5.75	35TH	10.80	4.25
15.14	5.96	40TH	11.40	4.49
15.90	6.26	45TH	12.00	4.72
16.50	6.50	50TH	12.50	4.92
17.16	6.75	55TH	13.20	5.20
17.80	7.01	60TH	13.80	5.43
18.50	7.28	65TH	14.30	5.63
18.90	7.44	70TH	14.90	5.87
19.60	7.72	75TH	15.45	6.08
20.48	8.06	80TH	16.10	6.34
21.39	8.42	85TH	16.80	6.61
22.90	9.02	90TH	17.80	7.01
25.60	10.08	95TH	19.09	7.52
26.44	10.40	97TH	20.00	7.87
26.92	10.60	98TH	20.90	8.23
27.50	10.83	99TH	21.70	8.54

(D40) WAIST-BUTTOCK DROP (OMPHALION)

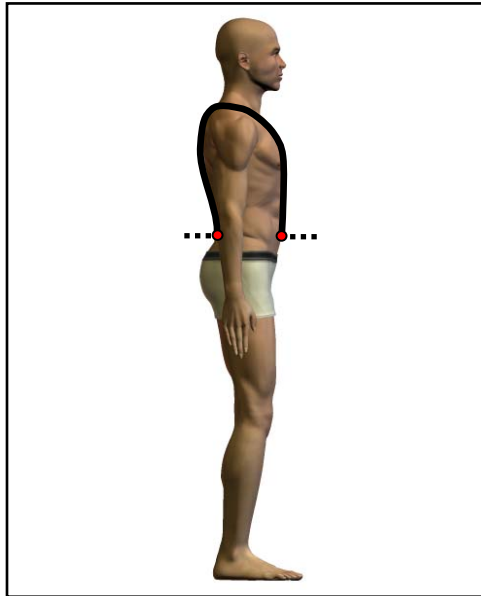
FEMALES		
CM		IN
16.38	MEAN	6.45
0.21	STD. ERROR (MEAN)	0.08
5.17	STANDARD DEVIATION	2.03
0.15	STD. ERROR (STD.DEV)	0.06
-3.70	MINIMUM	-1.46
31.40	MAXIMUM	12.36
SKEWNESS		-0.12
KURTOSIS		3.28
COEFFICIENT OF VARIATION		31.6%
NUMBER OF PARTICIPANTS		620

MALES		
CM		IN
12.20	MEAN	4.80
0.13	STD. ERROR (MEAN)	0.05
4.62	STANDARD DEVIATION	1.82
0.09	STD. ERROR (STD.DEV)	0.04
-5.70	MINIMUM	-2.24
23.70	MAXIMUM	9.33
SKEWNESS		-0.41
KURTOSIS		3.14
COEFFICIENT OF VARIATION		37.9%
NUMBER OF PARTICIPANTS		1301

FEMALES				FREQUENCIES				MALES			
E	FPct	CumF	CumFPct	CM				E	FPct	CumF	CumFPct
				-6.45	-	-5.45		1	0.08	1	0.08
				-5.45	-	-4.45		0	0.00	1	0.08
				-4.45	-	-3.45		0	0.00	1	0.08
1	0.16	1	0.16	-3.45	-	-2.45		1	0.08	2	0.15
0	0.00	1	0.16	-2.45	-	-1.45		2	0.15	4	0.31
0	0.00	1	0.16	-1.45	-	-0.45		8	0.61	12	0.92
0	0.00	1	0.16	-0.45	-	0.55		5	0.38	17	1.31
1	0.16	2	0.32	0.55	-	1.55		7	0.54	24	1.84
1	0.16	3	0.48	1.55	-	2.55		14	1.08	38	2.92
1	0.16	4	0.65	2.55	-	3.55		16	1.23	54	4.15
7	1.13	11	1.77	3.55	-	4.55		22	1.69	76	5.84
3	0.48	14	2.26	4.55	-	5.55		40	3.07	116	8.92
6	0.97	20	3.23	5.55	-	6.55		47	3.61	163	12.53
5	0.81	25	4.03	6.55	-	7.55		45	3.46	208	15.99
18	2.90	43	6.94	7.55	-	8.55		66	5.07	274	21.06
19	3.06	62	10.00	8.55	-	9.55		69	5.30	343	26.36
20	3.23	82	13.23	9.55	-	10.55		87	6.69	430	33.05
22	3.55	104	16.77	10.55	-	11.55		102	7.84	532	40.89
28	4.52	132	21.29	11.55	-	12.55		121	9.30	653	50.19
40	6.45	172	27.74	12.55	-	13.55		94	7.23	747	57.42
41	6.61	213	34.35	13.55	-	14.55		129	9.92	876	67.33
50	8.06	263	42.42	14.55	-	15.55		110	8.46	986	75.79
48	7.74	311	50.16	15.55	-	16.55		101	7.76	1087	83.55
46	7.42	357	57.58	16.55	-	17.55		69	5.30	1156	88.85
50	8.06	407	65.65	17.55	-	18.55		63	4.84	1219	93.70
55	8.87	462	74.52	18.55	-	19.55		30	2.31	1249	96.00
39	6.29	501	80.81	19.55	-	20.55		19	1.46	1268	97.46
32	5.16	533	85.97	20.55	-	21.55		18	1.38	1286	98.85
22	3.55	555	89.52	21.55	-	22.55		6	0.46	1292	99.31
12	1.94	567	91.45	22.55	-	23.55		6	0.46	1298	99.77
17	2.74	584	94.19	23.55	-	24.55		3	0.23	1301	100.00
5	0.81	589	95.00	24.55	-	25.55					
16	2.58	605	97.58	25.55	-	26.55					
10	1.61	615	99.19	26.55	-	27.55					
1	0.16	616	99.35	27.55	-	28.55					
0	0.00	616	99.35	28.55	-	29.55					
2	0.32	618	99.68	29.55	-	30.55					
2	0.32	620	100.00	30.55	-	31.55					

(D41) WAIST-WAIST (OMPHALION) OVER SHOULDER

The vertical circumference of the upper torso between the front of the waist at the navel (omphalion) passing up over the midpoint between the sternum and the anterior axillary fold, over the midshoulder landmark, and down the back to the waist (omphalion) posterior landmark is calculated as follows: VERTICAL TRUNK CIRCUMFERENCE (USA) minus CROTCH LENGTH (OMPHALION).



PERCENTILES				
FEMALES			MALES	
CM	IN		CM	IN
81.86	32.23	1ST	89.90	35.39
83.10	32.72	2ND	91.20	35.91
83.90	33.03	3RD	91.71	36.10
84.80	33.39	5TH	92.71	36.50
86.21	33.94	10TH	94.30	37.13
87.60	34.49	15TH	95.50	37.60
88.40	34.80	20TH	96.40	37.95
89.30	35.16	25TH	97.20	38.27
90.03	35.44	30TH	98.10	38.62
90.90	35.79	35TH	98.80	38.90
91.54	36.04	40TH	99.50	39.17
92.10	36.26	45TH	100.20	39.45
92.75	36.52	50TH	101.00	39.76
93.40	36.77	55TH	101.61	40.00
93.90	36.97	60TH	102.40	40.31
94.60	37.24	65TH	103.10	40.59
95.40	37.56	70TH	103.80	40.87
96.10	37.83	75TH	104.40	41.10
96.90	38.15	80TH	105.66	41.59
97.90	38.54	85TH	106.90	42.09
99.00	38.98	90TH	108.80	42.83
100.90	39.72	95TH	110.90	43.66
103.47	40.74	97TH	112.30	44.21
105.42	41.50	98TH	113.60	44.72
107.30	42.24	99TH	115.00	45.28

(D41) WAIST-WAIST (OMPHALION) OVER SHOULDER

FEMALES		
<u>CM</u>		<u>IN</u>
92.82	MEAN	36.54
0.20	STD. ERROR (MEAN)	0.08
5.08	STANDARD DEVIATION	2.00
0.14	STD. ERROR (STD.DEV)	0.06
79.20	MINIMUM	31.18
109.00	MAXIMUM	42.91
SKEWNESS		0.28
KURTOSIS		3.30
COEFFICIENT OF VARIATION		5.5%
NUMBER OF PARTICIPANTS		620

MALES		
<u>CM</u>		<u>IN</u>
101.20	MEAN	39.84
0.15	STD. ERROR (MEAN)	0.06
5.57	STANDARD DEVIATION	2.19
0.11	STD. ERROR (STD.DEV)	0.04
84.40	MINIMUM	33.23
121.70	MAXIMUM	47.91
SKEWNESS		0.32
KURTOSIS		3.21
COEFFICIENT OF VARIATION		5.5%
NUMBER OF PARTICIPANTS		1301

FREQUENCIES											
FEMALES								MALES			
<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>	<u>CM</u>				<u>E</u>	<u>FPct</u>	<u>CumF</u>	<u>CumFPct</u>
1	0.16	1	0.16	78.55	-	79.55					
2	0.32	3	0.48	79.55	-	80.55					
2	0.32	5	0.81	80.55	-	81.55					
5	0.81	10	1.61	81.55	-	82.55					
5	0.81	15	2.42	82.55	-	83.55					
13	2.10	28	4.52	83.55	-	84.55		1	0.08	1	0.08
16	2.58	44	7.10	84.55	-	85.55		1	0.08	2	0.15
23	3.71	67	10.81	85.55	-	86.55		3	0.23	5	0.38
24	3.87	91	14.68	86.55	-	87.55		0	0.00	5	0.38
35	5.65	126	20.32	87.55	-	88.55		3	0.23	8	0.61
39	6.29	165	26.61	88.55	-	89.55		3	0.23	11	0.85
35	5.65	200	32.26	89.55	-	90.55		9	0.69	20	1.54
48	7.74	248	40.00	90.55	-	91.55		11	0.85	31	2.38
53	8.55	301	48.55	91.55	-	92.55		27	2.08	58	4.46
48	7.74	349	56.29	92.55	-	93.55		40	3.07	98	7.53
53	8.55	402	64.84	93.55	-	94.55		38	2.92	136	10.45
41	6.61	443	71.45	94.55	-	95.55		66	5.07	202	15.53
38	6.13	481	77.58	95.55	-	96.55		68	5.23	270	20.75
36	5.81	517	83.39	96.55	-	97.55		78	6.00	348	26.75
33	5.32	550	88.71	97.55	-	98.55		88	6.76	436	33.51
22	3.55	572	92.26	98.55	-	99.55		91	6.99	527	40.51
14	2.26	586	94.52	99.55	-	100.55		84	6.46	611	46.96
7	1.13	593	95.65	100.55	-	101.55		99	7.61	710	54.57
3	0.48	596	96.13	101.55	-	102.55		84	6.46	794	61.03
6	0.97	602	97.10	102.55	-	103.55		98	7.53	892	68.56
5	0.81	607	97.90	103.55	-	104.55		91	6.99	983	75.56
1	0.16	608	98.06	104.55	-	105.55		52	4.00	1035	79.55
3	0.48	611	98.55	105.55	-	106.55		52	4.00	1087	83.55
5	0.81	616	99.35	106.55	-	107.55		49	3.77	1136	87.32
3	0.48	619	99.84	107.55	-	108.55		26	2.00	1162	89.32
1	0.16	620	100.00	108.55	-	109.55		34	2.61	1196	91.93
				109.55	-	110.55		29	2.23	1225	94.16
				110.55	-	111.55		22	1.69	1247	95.85
				111.55	-	112.55		19	1.46	1266	97.31
				112.55	-	113.55		8	0.61	1274	97.92
				113.55	-	114.55		10	0.77	1284	98.69
				114.55	-	115.55		8	0.61	1292	99.31
				115.55	-	116.55		3	0.23	1295	99.54
				116.55	-	117.55		0	0.00	1295	99.54
				117.55	-	118.55		0	0.00	1295	99.54
				118.55	-	119.55		3	0.23	1298	99.77
				119.55	-	120.55		0	0.00	1298	99.77
				120.55	-	121.55		1	0.08	1299	99.85
				121.55	-	122.55		2	0.15	1301	100.00

CHAPTER VI

PREVIOUS SURVEYS OF U.S. MARINE CORPS PERSONNEL: A COMPARATIVE STUDY

Prior to the MC-ANSUR anthropometric survey conducted in 2010, large scale studies of the Marine Corps anthropometry took place in 1966 and 1994, both conducted by NSRDEC. The 1966 USMC survey comprised 70 body dimensions on 2008 male Marines (White and Churchill, 1977). The 1994 USMC mini-survey comprised 12 dimensions on 493 male and 470 female Marines (Donelson and Gordon, 1996). To understand the body size and shape differences that are seen in today's Marines, the male data from the 1966, 1994, and 2010 surveys were compared, as were the female data from 1994 and 2010.

The first step for the comparisons was to determine which of the dimensions measured in each survey were reasonably comparable, based on their published dimension descriptions (Donelson and Gordon, 1996; Hotzman et al., 2011; White and Churchill, 1977) and then choose the most informative for the comparison. Table 18 lists the dimensions from each survey used in this analysis. Since females were only measured in the 1994 and 2010 surveys, only 11 dimensions can be compared.

TABLE 18

Comparable Dimensions from Previous USMC Surveys

Dimension	1966	1994	2010
Bizygomatic Breadth	✓		✓
Buttock Circumference	✓	✓	✓
Buttock-Knee Length	✓		✓
Chest Circumference	✓	✓	✓
Foot Breadth, Horizontal	✓	✓	✓
Foot Length	✓	✓	✓
Head Circumference	✓	✓	✓
Hip Breadth, Sitting	✓		✓
Knee Height, Sitting	✓		✓
Menton-Sellion Length	✓	✓	✓
Sitting Height	✓	✓	✓
Sleeve Outseam		✓	✓
Stature	✓	✓	✓
Waist Circumference (Omphalion)	✓	✓	✓
Weight	✓	✓	✓

6.1 OVERALL POPULATION CHANGES

In this section, the anthropometric data for the most informative dimensions are compared. Any understanding of the differences, however, requires an understanding of the differences between the three samples. The 1966 survey was essentially a

convenience sample. The result of this was that most of the Marines in the sample were quite young. Approximately 66% were 20 years or younger (White & Churchill, 1977). In 1994 and 2010, the sampling plans aimed for a closer age match to the actual USMC population. In 1994, 26% of the sample was 20 years or younger (Donelson and Gordon 1994), and in 2010, 27% were in that age group. The anthropometric consequence of that dramatic difference in age distribution is that many of the weight-related dimensions would naturally be larger in the samples with older Marines. Apparent differences seen between 1966 and the two later studies are partially a result of changes in the body size and shape of Marines over the 45 years and partially a result of differences in the age distributions.

The anthropometric data from the three time periods were compared in two ways. First, T-tests were performed to compare mean values. This is a traditional test designed to look for overall differences between populations for a particular characteristic. In this case, the null hypothesis is that there is no difference between the populations (the same population sampled at different times). Although this test is of some interest biologically, it is less critical in the case of product design values, since most design requirements make use of extreme percentiles, rather than the mean. Thus, the 5th percentile female values and the 95th percentile male values across time periods were also compared. These two percentiles are most often seen in design requirements.

For females, individual T-tests were conducted between the 1994 and 2010 means (Table 19). Since many comparisons were being done simultaneously, Bonferroni corrections were applied (Dunn, 1961). Eleven dimensions were examined for both the female and the male comparisons. To obtain an overall significance level of $\alpha=0.05$, the significance level for any individual comparison using the Bonferroni correction is ≤ 0.0045 (i.e., $0.05/11$). The yellow highlighted cells in Table 19 and subsequent tables are values significant at the 0.05 level or better after Bonferroni correction.

Seven dimensions (of the eleven) were statistically significantly different for females at the mean. Of these, Buttock Circumference (1.69 cm) and Waist Circumference (5.11 cm) were both larger in the 2010 data, which corresponds with an increase in Weight (1.65 kg) between the two time periods (Table 19). The standard deviation for Waist Circumference also increased by 1.11 cm, indicating that this dimension had increased in variability as well. Two head dimensions, Head Circumference and Menton-Sellion Length, were also larger in 2010. The differences were small (0.3 cm or less), but still larger than the observer error for those dimensions (See Chapter VIII). The -0.78 cm difference in Sitting Height indicates that this measurement was smaller in the 2010 sample than in the 1994 sample. This is consistent with a smaller stature, although the 0.59 cm negative difference in Stature is not statistically significant. All in all, however, the differences at the mean are not large between the two time periods. The differences at the 5th percentile level—more important for product and workspace design—are discussed below.

TABLE 19

T-test Result Comparisons for Female Dimensions
(values in cm and kg)

Dimension	Mean			T-test Results	Standard Deviation		
	1994	2010	Delta ('10-'94)	t	1994	2010	Delta ('10-'94)
Buttock Circumference	97.33	99.02	1.69	4.519	5.86	6.20	0.34
Chest Circumference	92.57	92.20	-0.37	-0.967	5.98	6.40	0.42
Foot Breadth, Horizontal	9.08	9.11	0.03	0.955	0.49	0.45	-0.04
Foot Length	24.27	24.44	0.17	2.328	1.20	1.19	-0.01
Head Circumference	55.24	55.54	0.30	3.009†	1.43	1.74	0.31
Menton-Sellion Length	11.28	11.53	0.25	6.619	0.60	0.64	0.04
Sitting Height	86.68	85.90	-0.78	-4.016	3.08	3.30	0.22
Sleeve Outseam	54.84	54.34	-0.50	-2.835†	2.99	2.71	-0.28
Stature	163.08	162.49	-0.59	-1.574	6.07	6.22	0.15
Waist Circumference (Omphalion)	77.53	82.64	5.11	11.207†	6.94	8.05	1.11
Weight	61.95	63.60	1.65	3.266	7.92	8.40	0.48

Shaded cells indicate statistical significance with the Bonferroni correction.

†Equal variances are assumed except where noted by † on the t value.

In the case of males, there were several more dimensions to compare and three time periods (Table 20). For the male 1966/2010 comparisons, there were a total of 14 dimensions examined, so the individual comparison at the 0.05 significance level after the Bonferroni correction was applied is ≤ 0.0036 . As in the case of the females, there were 11 dimensions from 1994, so the Bonferroni-corrected 0.05 significance level was ≤ 0.0045 for each of the 1994/2010 comparisons. For the two head dimensions, Menton-Sellion Length for both survey comparisons and Head Circumference for the 1966/2010 comparison were significantly different. The 2010 dimensions were larger, but the differences were all less than 1 cm and, thus, of limited practical significance. Both the 2010 foot dimensions were significantly different for all the comparisons, showing a trend from smallest in 1966 to largest in 2010.

Stature was the only height dimension compared, and it showed a significant difference between 1966/2010, but not for the 1994/2010 comparison. Stature was larger by 0.78 cm in the 2010 study than in the 1966 study.

There were large and significant differences between the survey results for male body circumferences (Table 20). The largest differences were in Waist Circumference (9.9 cm), Chest Circumference (8.8 cm), and Buttock Circumference (5.8 cm). The standard deviation increased more than 1 cm for Buttock Circumference and Chest Circumference, indicating that these dimensions increased in variability. The standard deviation for Weight also increased by 2.95 kg since 1966.

The differences between male 2010 values and 1966 values for the seated dimensions show a very clear pattern of a slightly taller, but more significantly, heavier Marine. Sitting Height and Knee Height, Sitting were larger for the 2010 sample. Buttock-Knee Length, on the other hand, was longer, which is consistent with both a longer leg and a larger buttock. Similarly, Hip Breadth Sitting was larger by 3.15 cm. All of these differences were statistically significant at the 0.05 level after the Bonferroni correction.

6.2 DESIGN POINT CHANGES

Many of the dimensions discussed in Section 6.1 are used to set user accommodation limits, whether in aircraft, clothing, or protective equipment. Often, designs are mandated to accommodate a range from the 5th percentile female value to the 95th percentile male value. Therefore, other statistics of interest are the 5th and 95th percentiles and their confidence limits. Comparative data for these two statistics are reported in Table 21 for the 1994 and 2010 surveys. The earlier 1966 survey is not included here because recent design has made use of the 1994 survey rather than the 1966 survey. The highlighted deltas mean there was no overlap in confidence intervals for the two surveys; that is, they are significantly different.

TABLE 20

T-test Result Comparisons for Male Dimensions
(values in cm and kg)

Dimension	Mean			T-test Results 1966 and 2010		T-test Results 1994 and 2010		Standard Deviation				
	1966	1994	2010	Delta (‘10-‘66)	t	Delta (‘10-‘94)	t	1966	1994	2010	Delta (‘10-‘66)	Delta (‘10-‘94)
Bizygomatic Breadth	13.97	-	14.28	0.31	15.162†	-	-	0.54	-	0.59	0.05	-
Buttock Circumference	94.85	99.18	100.60	5.75	26.026†	1.42	4.364†	5.24	5.91	6.77	1.53	0.86
Buttock-Knee Length	59.51	-	61.32	1.81	17.293†	-	-	2.72	-	3.07	0.35	-
Chest Circumference	94.26	100.95	103.03	8.77	35.416†	2.08	5.245	5.83	7.20	7.59	1.76	0.39
Foot Breadth, Horizontal	9.80	10.01	10.12	0.32	17.070	0.11	3.754	0.52	0.53	0.53	0.01	0.00
Foot Length	26.70	26.89	27.10	0.40	8.559	0.21	3.017	1.29	1.26	1.28	-0.01	0.02
Head Circumference	56.13	56.88	57.10	0.97	17.756	0.22	2.779	1.54	1.49	1.52	-0.02	0.03
Hip Breadth, Sitting	34.16	-	37.31	3.15	36.675†	-	-	2.02	-	2.64	0.62	-
Knee Height, Sitting	54.23	-	55.40	1.17	12.045†	-	-	2.63	-	2.81	0.18	-
Menton-Sellion Length	12.02	12.21	12.40	0.38	16.407	0.19	5.485	0.65	0.67	0.66	0.01	-0.01
Sitting Height	90.99	92.47	91.91	0.90	7.303	-0.56	-2.991	3.53	3.29	3.56	0.03	0.27
Sleeve Outseam	-	59.48	58.97	-	-	-0.51	-3.128	-	3.05	3.02	-	-0.03
Stature	174.56	175.72	175.34	0.78	3.271†	-0.38	-1.042	6.31	6.67	6.97	0.66	0.30
Waist Circ (Omphalion)	78.54	87.16	88.40	9.86	31.156†	1.24	2.688	8.82	8.32	8.90	0.08	0.58
Weight	72.65	79.04	80.60	7.95	20.233†	1.56	2.771†	8.93	10.12	11.88	2.95	1.76

Shaded cells indicate statistical significance with the Bonferroni correction.

†Equal variances are assumed except where noted by † on the t value.

TABLE 21

Female 5th Percentiles and Male 95th Percentiles for Comparison Dimensions
(values in cm and kg)

Dimension	Female 5 th Percentiles			Male 95 th Percentiles		
	1994	2010	Delta (‘10-‘94)	1994	2010	Delta (‘10-‘94)
Bizygomatic Breadth	-	12.5	-	-	15.3	-
Buttock Circumference	87.5	89.0	1.5	108.9	112.3	3.4
Buttock-Knee Length	-	53.8	-	-	66.8	-
Chest Circumference	83.9	82.1	-1.8	113.0	115.9	2.9
Foot Breadth, Horizontal	8.3	8.4	0.1	10.9	11.0	0.1
Foot Length	22.5	22.7	0.2	29.0	29.3	0.3
Head Circumference	52.7	52.8	0.1	59.5	59.5	0.0
Hip Breadth, Sitting	-	35.2	-	-	42.1	-
Knee Height, Sitting	-	46.8	-	-	60.2	-
Menton-Sellion Length	10.3	10.5	0.2	13.4	13.5	0.1
Sitting Height	81.5	80.5	-1.0	97.9	97.8	-0.1
Sleeve Outseam	50.2	50.0	-0.2	64.5	64.2	-0.3
Stature	152.8	152.3	-0.5	187.2	187.3	0.1
Waist Circumference (Omphalion)	66.7	71.1	4.4	101.2	103.7	2.5
Weight	50.2	50.9	0.7	95.5	101.7	6.2

Shaded cells indicate statistical significance with the Bonferroni correction.

Body circumferences and weight have undergone the most significant changes since 1994. Chest Circumference has increased at the 95th percentile by 2.9 cm, while Buttock Circumference has increased by 3.4 cm. The net effect of both is an increase in the design range, since the increases are at the upper end and there are no statistically significant differences at the lower end of the range. The Chest Circumference difference is about half a size on a 3-in grade. Waist Circumference increased at both the low end and the high end of the design range, ironically decreasing the design range from 34.5 cm to 32.6 cm. The increase at the 95th percentile is about half a size on a two-in grade, which is often seen in trousers. The 6.2 kg increase in male 95th percentile Weight may indicate a need for upward adjustment of the requirements for various safety systems where body support is a key component.

6.3 CONCLUSIONS

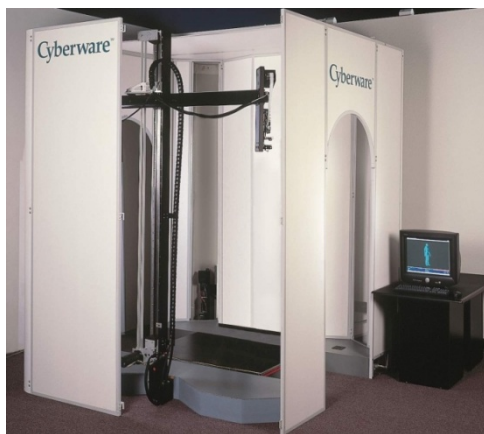
These data suggest that the Marine population has undergone marked anthropometric changes in the last 44 years. Overall the dimensions that have seen the most changes are those related to an increase in weight. This trend is similar to, although smaller than, the trend seen in the American population as a whole. These differences have implications for the design of clothing, protective equipment, and work spaces used by the USMC. Updates of product and garment design and new tariffs of sized items may be needed.

CHAPTER VII

THREE-DIMENSIONAL SCANNING

In addition to the traditional measurement stations, MC-ANSUR participants also visited the scanning station, where 3-D images were taken by three digital scanners: whole-body, head, and foot. Team members directed participants to each of the three scanners in a sequence that minimized wait time.

All three machines used in this survey—the Cyberware WBX and PX scanners, and the INFOOT foot scanner—were low-power, infrared laser systems that offer no risk of damage to the body (Figure 21). The machines were calibrated daily. Cyscan, the software for the WBX and PX systems, runs on the Windows XP operating system, as does the INFOOT software used in conjunction with the foot scanner. The computers associated with the scanners were set up so that they only connected with the in-field Anthrotech network. Scan data files were transferred over this network via Ethernet data cable connection to the local system server and then uploaded daily to a server located in Yellow Springs, OH (Anthrotech HQ). Data files were transferred daily to a secure server at NSRDEC via a secure connection.



WBX



PX



Foot Scanner

FIGURE 21

Scanning Instruments

Furnished by the Government, the CyScan software on the WBX runs in conjunction with the EARS program. EARS (Yin et al., 2009; Yin et al., 2010), also furnished by the Government, was used as an evaluation step to assist the operator in evaluating scan quality.

7.1 PARTICIPANT PREPARATION

When participants arrived at the scanning stations, they were shown to a changing room and asked to change into the appropriately sized scan wear. Scan wear

was spandex compression shorts for men and spandex shorts and a jog bra for women. Wig caps were placed on the participants' heads to 1) allow capture of the head surface and 2) compress the hair to minimize the increase to apparent head size caused by hair bulk. Some hair types and styles also caused irregular reflections of the laser light, resulting in extraneous points on the scan; the wig cap minimized this effect as well. A team member placed orange half-inch adhesive dots over selected landmarks previously drawn on the body and orange quarter-inch adhesive dots on all head landmarks. Wooden disks were used to mark left and right acromion landmarks. The landmarks used for the scan procedure are illustrated in Figures 22 through 25.

The participant was then directed to whichever scanner was available. Scanning of a single participant took approximately 15-20 seconds to complete for each scanner, but he/she was asked to remain in the scanner while the operator checked the visual images, as re-scans were sometimes necessary to correct problems that showed up.

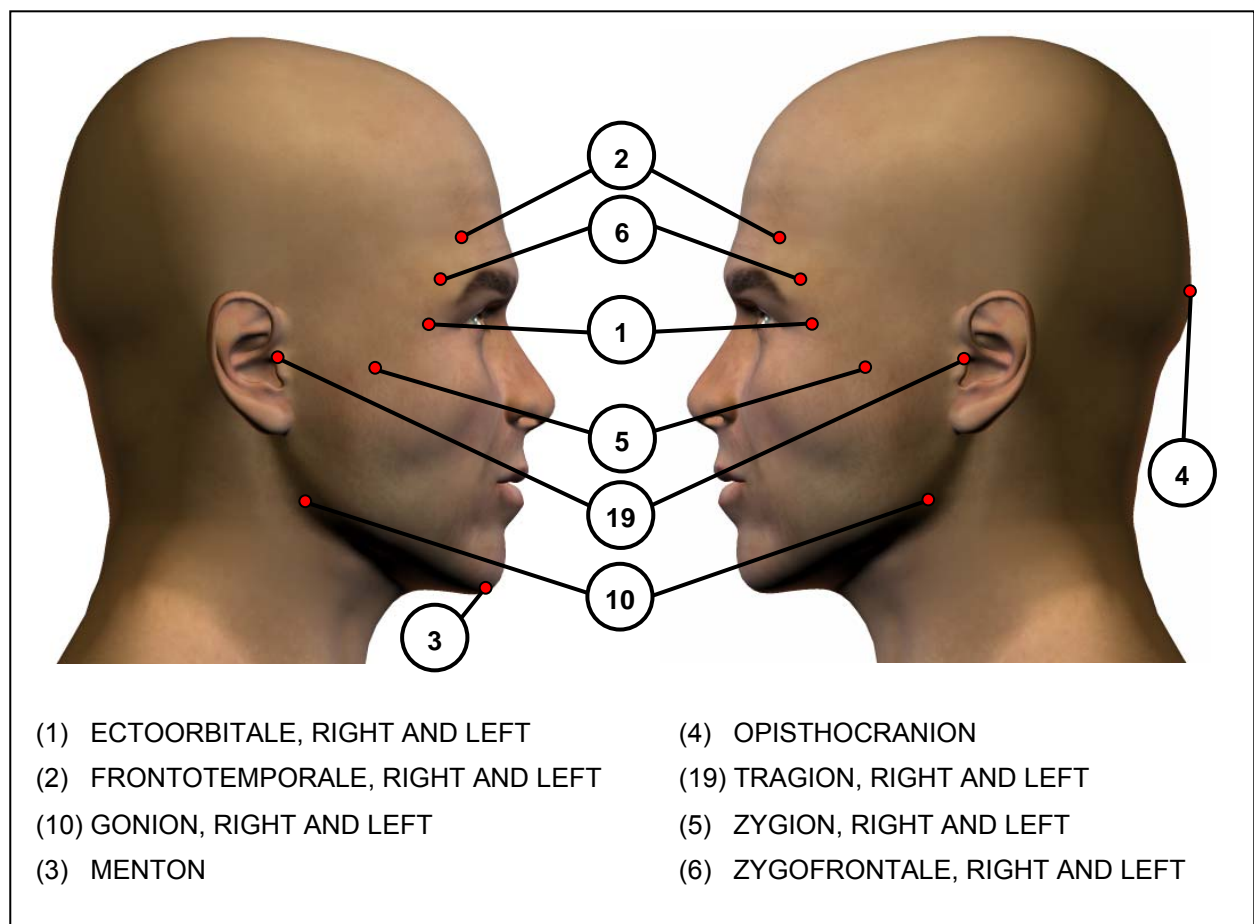


FIGURE 22

Lateral View of Head Scanning Landmarks

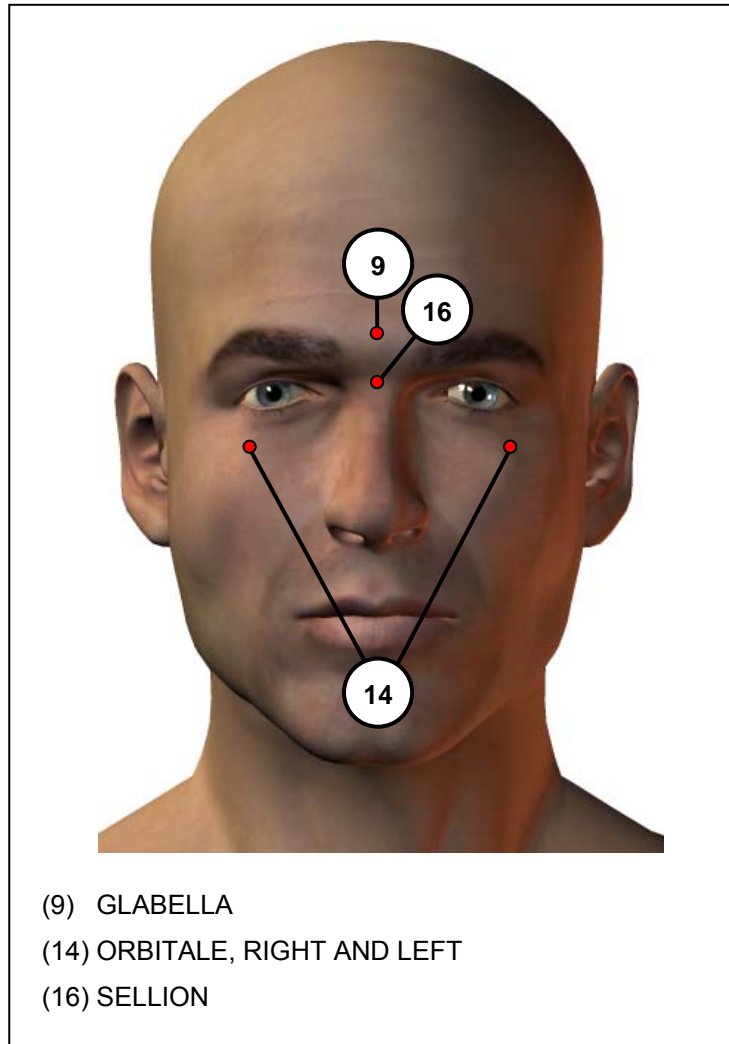
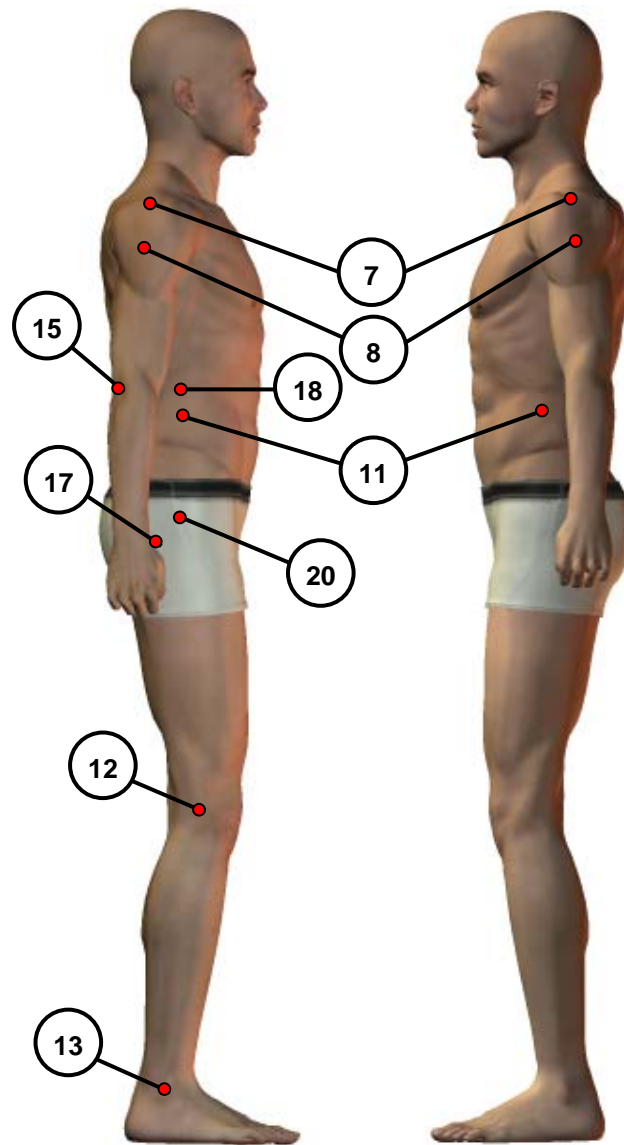


FIGURE 23

Anterior View of Head Scanning Landmarks



- (7) ACROMION, RIGHT AND LEFT
- (8) DELTOID POINT, RIGHT AND LEFT
- (11) ILIOCRISTALE, RIGHT AND LEFT
- (12) LATERAL FEMORAL EPICONDYLE,
STANDING, RIGHT

- (13) LATERAL MALLEOLUS, RIGHT
- (15) RADIALE, RIGHT
- (17) STYLION, RIGHT
- (18) TENTH RIB, RIGHT
- (20) TROCHANTERION, RIGHT

FIGURE 24

Lateral View of Body Scanning Landmarks

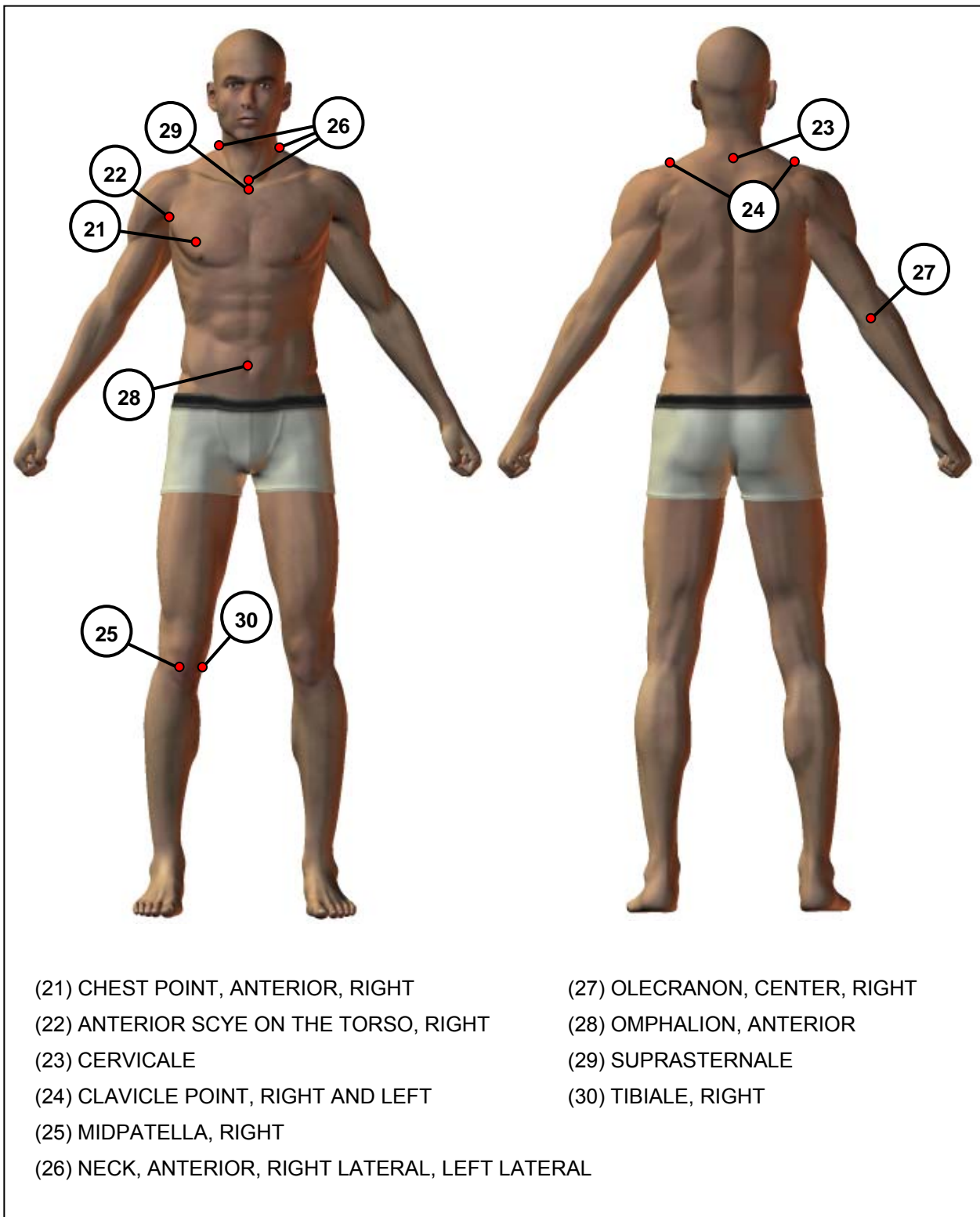


FIGURE 25

Anterior (Left) and Posterior (Right) Views of Body Scanning Landmarks

7.1.1 Whole-Body Scanning

Participants were briefed on the proper posture to assume for the whole-body scan (Figures 26 and 27). In general, the position required that participants stand erect without stiffness. The feet were positioned 30 cm apart and parallel to one another. The arms were straight and held away from the body with fists clenched. The head was in the Frankfurt plane. When participants stepped onto the scan platform, a team member checked to make sure that the scan wear was wrinkle-free, that the wig caps were placed correctly, and that all the landmark dots were in place.

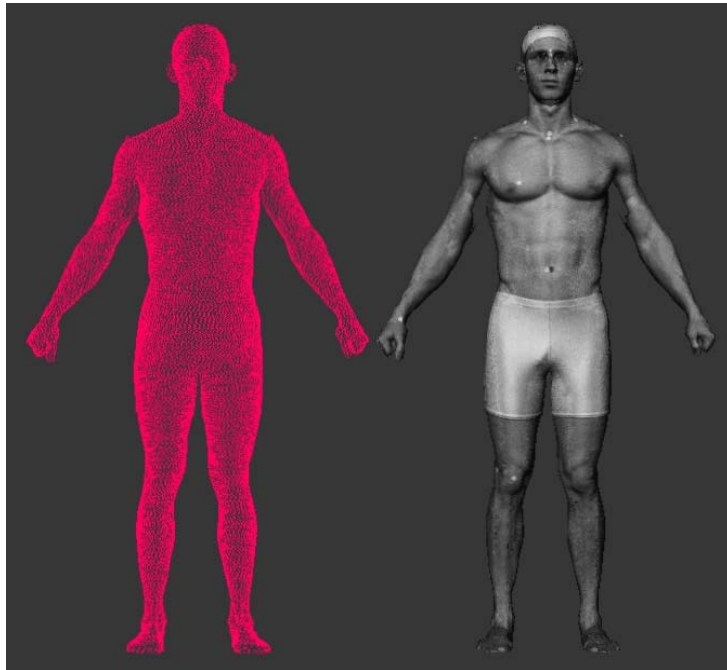


FIGURE 26

Anterior View of Whole-Body Scan*

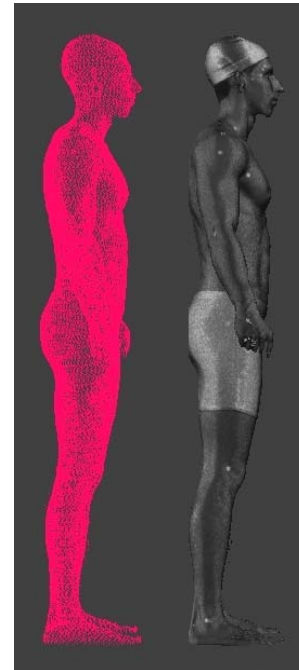


FIGURE 27

Lateral View of Whole-Body Scan

7.1.2 Head Scanning

Head scans were taken with participants in the seated position. Operators adjusted the height of the chair to ensure that the head was within the scanner field and lightly touched the head stabilizer. Participants were positioned with their heads in the Frankfurt plane and then asked to lift their chins slightly to enable the scanner to completely capture the region beneath the chin (Figures 28 and 29).

* The individual shown in Figures 26-31 is a civilian model, and was not part of MC-ANSUR.

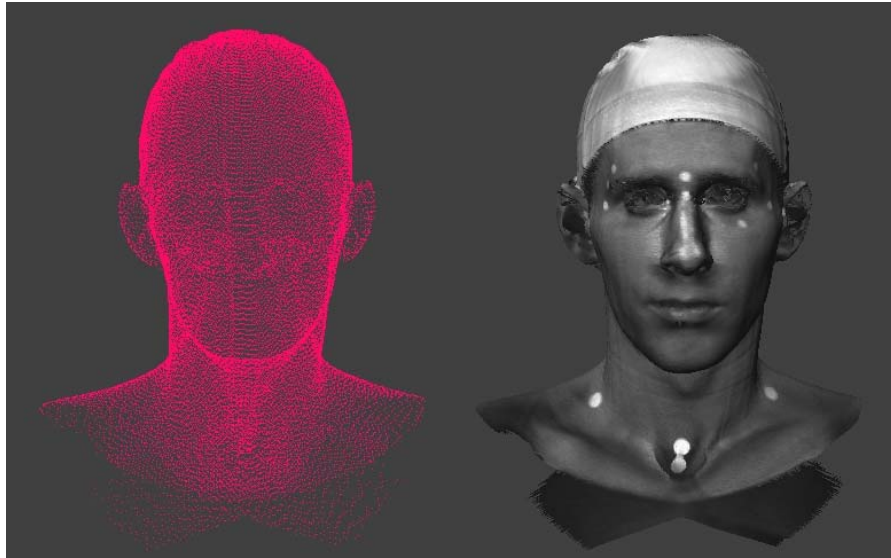


FIGURE 28

Anterior View of Head Scan

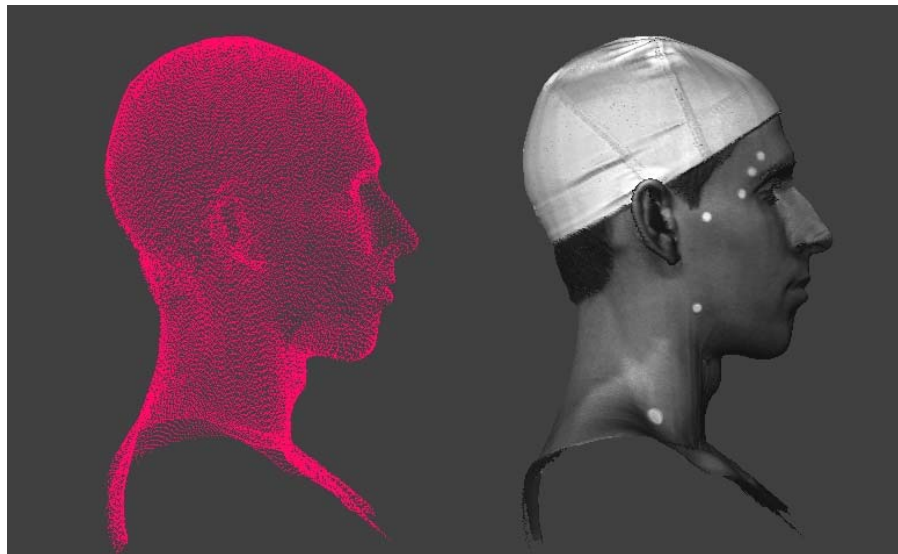


FIGURE 29

Lateral View of Head Scan

7.1.3 Foot Scanning

In preparation for foot scanning, which was done on the right foot only, a team member checked that the right foot was clean and dry (without perspiration). If the participant had noticeable leg hair, he or she was asked to put on a stocking from ankle to knee to prevent scan distortion caused by hair. A sanitary protective paper was wrapped around the leg just below the knee where the scanner closed around the leg.

Each participant was asked to step onto the left-foot stage with the left foot and to place the right foot into the scanner. The right foot was aligned with marks on the bottom of the scanner base. Scans were taken in the standing posture with the weight distributed evenly between both feet. Foot scans are seen in Figures 30 and 31.

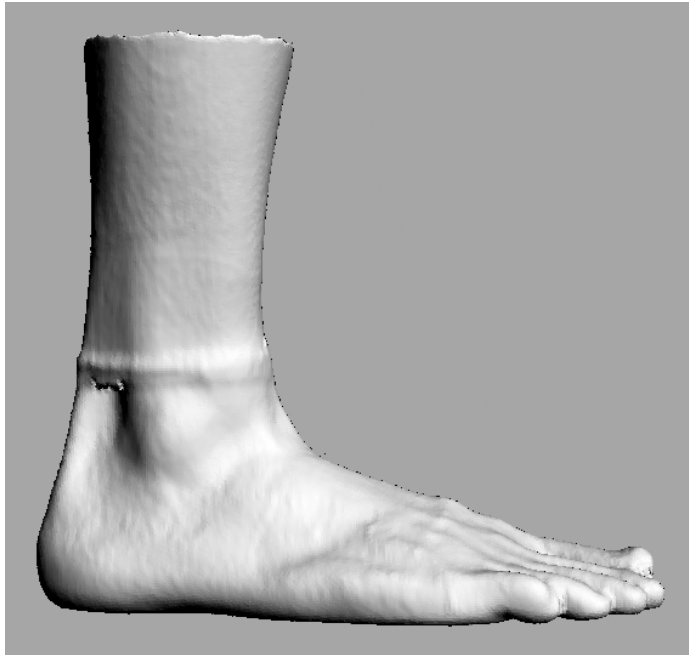


FIGURE 30

Lateral View of Foot Scan

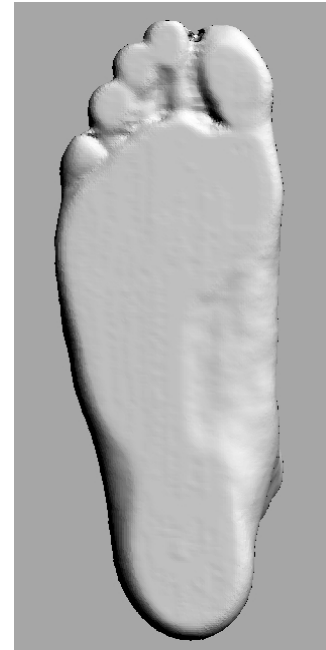


FIGURE 31

Plantar View of Foot Scan

7.2 THE UTILITY OF 3-D SCANNING

Until the 1980s, anthropometric databases consisted almost wholly of hundreds of manually measured body-size variables obtained by using traditional instruments such as anthropometers, calipers, and tapes. These methods, when properly employed, were—and still are—a highly accurate means of documenting the body sizes of individuals and of whole populations. What traditional anthropometry cannot do well, however, is reflect human shape. Approximately 30 years ago, the nation's military services began to explore 3-D scanning methodology as a means of supplementing their existing anthropometric databases—beginning with the use of smaller devices for scanning heads and other body parts and, today, use of whole-body scanners.

The two most common uses of 3-D scan data in an ergonomic context are in the design, sizing, and production of military clothing and equipment and the creation of accurately proportioned 3-D computer-aided design (CAD) models for the ergonomic design of working environments. Today, the entire production chain for a piece of clothing, beginning with the design and sizing of an item and culminating in the fabrication of the garment, can be achieved in a computer environment populated by 3-D models (Grotepass et al., 2002). While a large-scale operation such as this is still in

the future for the nation's military services, a digital system for custom designing clothing for service personnel who fall outside established anthropometric design limits is already under limited trial (Gentsch et al., 2000). The obvious advantages of 3-D scan images for this undertaking include the production of better-fitting garments, reduction in the costs of stocking unusual sizes, and faster response time between measurement and delivery.

Three-dimensional human analogues created from scanned images have an almost infinite number of uses in the design of workplaces such as military vehicles and cockpits where accommodation, lines of vision, and ability to reach hand and foot controls can be tested on a computer screen. Fully dressed and equipped soldiers can also be scanned for input into CAD models for assessing workplace interactions.

Other uses for 3-D images stem from the ability of the scanner to record the surface area and volume of the body or any of its parts. The Army made early use of this capacity, for example, by writing software for the scanner to assess the degree of ballistic protection afforded soldiers wearing various designs of protective body armor (Paquette, 1996).

As an anthropometric tool, 3-D scanning complements traditional methods in two ways. First, a participant can be scanned in a matter of seconds, and the scanned images become permanent records. Users can return to them as many times as needed to extract new dimensions or to employ them in the creation of computer models. Second, the relationship of one dimension to another, or to several other dimensions, is clearly apparent. This aids in understanding body shape, as well as body size.

7.3 TRADITIONAL ANTHROPOMETRY AND 3-D SCANNING

While some progress has been made in achieving consistency between traditional anthropometric measurements and those obtained by extraction from 3-D scans, significant differences between the two techniques remain. While researchers have identified a number of reasons for these differences (Han et al., 2010; Perkins et al., 2000; Kouchi & Mochimaru, 2006), the three chief causes appear to be tissue compression that occurs in manual measurements, algorithms used to extract measurements from 3-D images, and posture.

Comparisons show that scan-generated measurements tend to be significantly larger than those obtained by manual measurement. One way to assess the importance of these differences is to determine whether they exceed the allowable errors established for interobserver differences in the first ANSUR survey (Gordon et al., 1989) and subsequently adopted by the International Organization for Standardization (ISO) (ISO 20685). A recent study of 14 comparative measurements, for example, found that the differences between the scanned and traditional measurements exceeded the allowable errors specified by ISO 20685 in all cases (Han et al., 2010).

In these comparisons, circumference measurements are the most problematic. Manual methods of measuring around the body and its parts generally require that the tape be in contact with the skin all the way around the body part. This is difficult to achieve without slightly compressing the flesh and, thus, may result in a somewhat smaller value than that obtained by the scanner, which simply “sees” the outlines and has no effect on the tissue. An alternative explanation, persuasive especially for scanners with lower point density, is that the scanner-extracted circumference must use available points, essentially “connecting the dots” and that that route between dots may be more jagged (and therefore longer) than the smooth route taken by the tape.

When sufficient care is taken in positioning the participant and ensuring that the hair is covered by a bald cap, heights and lengths in general show smaller, though sometimes significant, discrepancies. Han and her colleagues (2010) have developed regression equations for adjusting values of some extracted scan data to make them more consistent with traditionally measured values.

7.4 POSTURE

Consistent participant positioning is a major factor in obtaining reliable body-size measurements in both traditional and 3-D scanning methods, as well as a source of differences in outcome between the two methods when whole-body scanning is required. The basic standing posture used in manual measuring calls for the participant to stand straight with the heels together and the arms hanging relaxed at the sides. This position is impractical for a system that uses light to produce digital images. When arms and legs are too close to the torso, or too close together, they prevent the scanner from capturing other parts of the body (such as the crotch and armpits). Thus, scanned participants are asked to stand with arms held away from the body and legs placed farther apart.

Experiments conducted by Kouchi and Mochimaru (2006) established the effects of postural differences in 42 manual and scanned measurements of 40 Japanese adults. Participants were measured and scanned in four different positions, the basic traditional posture (Figure 32a), and in three postures in which the arms were held increasingly away from the body and the feet were spread increasingly apart. The researchers found that leg abduction significantly affected hip and thigh measurements, while abduction of the arms significantly affected measurements of the shoulder and chest. For most other variables, when the feet were placed less than 25 cm apart and the arms were abducted less than 10°, the measurements were comparable to those obtained in the basic traditional posture. The posture used in MC-ANSUR is very similar to this posture (Figure 32b).

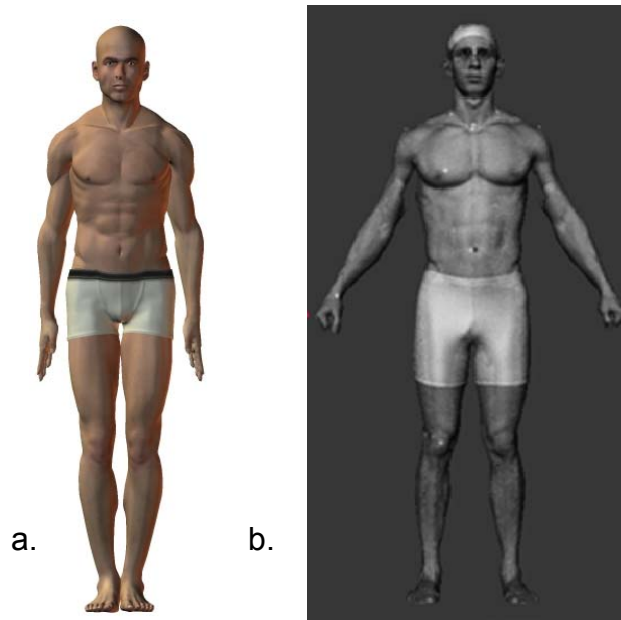


FIGURE 32

Traditional and MC-ANSUR Posture

Posture is especially important in systems where measurements and landmarks are located automatically. The algorithms that locate measurement points assume a particular posture on the part of the participant. If the participant is in a posture that differs from the assumed posture, even slightly, then measurements can be taken at inappropriate locations. Of course, such measurements are never comparable.

In general, it is difficult to draw too many conclusions about the comparability of scan-extracted and directly measured anthropometry from the published literature. The tested systems vary in scan quality, and they vary in the mathematical techniques used in extracting dimensions. Some of these applications can be used on any scan; others function only on one system. Some systems are fully automatic—they can extract dimensions from a scan whose participant has had no preparation. Others require an operator to identify a set of key landmarks before extraction can begin. Still others identify landmarks that have been identified through palpation (by a trained anthropometrist) prior to scanning. The consensus in the anthropometric community is that the most likely way to obtain scan-extracted dimensions that are similar to traditionally measured ones is to pre-mark the study participants using palpation of traditional landmarks. That was the approach taken in this study. As scan extraction software continues to improve, this data set will continue to be useful, since the landmarks were verified through palpation and they are visible on the scan.

CHAPTER VIII

OBSERVER ERROR

Since anthropometric data are used in the design of workspaces, uniforms, and personal protective clothing and equipment, excessive error in the data can result in badly designed workspaces, poorly fitting uniforms, and potentially unsafe protective gear. Further, several studies have shown that insufficient information about observer error can lead to misinterpretation of population comparisons (Jamison and Zegura, 1974; Utermohle and Zegura, 1982; Utermohle et al., 1983). While considerable effort was made to minimize the amount of interobserver error (hereafter, observer error) in the MC-ANSUR survey, observer error is a fact of life in almost any scientific endeavor. Because such problems cannot be eliminated entirely, the most responsible approach is to measure the observer error so that users of the data will be able to judge for themselves its effects on their particular applications.

Error analysis of anthropometric data is usually performed *after* the data collection has been completed. The approach used in the MC-ANSUR survey was to establish an allowable observer error for each dimension *prior* to the commencement of data collection. This enabled the use of repeated measures data during the survey to monitor and improve the quality of the data. Selected participants were re-measured daily at each station throughout the course of the survey, and the resultant data were analyzed weekly for observer error. This information was used as continuous feedback to the team to maintain the high quality of the data collection.

The allowable errors were established for three purposes. First, they were used during the initial training period as an indicator that measurers had successfully learned their tasks. Team members made practice measurements on a group of participants to learn their assigned dimensions. Observer error results were calculated regularly to assess the ability of each measurer to repeat measurements within fixed limitations, and the ability of each pair of measurers to achieve interobserver consistency. The performance of measurers in training was rated against standards established by experienced measurers (see Section 8.2).

The second use of the allowable observer error levels was to "recalibrate" the team at the beginning of each new survey location. Because the team traveled by car to each new location, there was often a period of several days between measuring sessions. In order to ensure consistency from one location to the next and to minimize measurer "drift" during the course of the survey, error trials were conducted at the beginning of each new location.

Finally, allowable observer error was used as a standard for daily error checks. Twice a day, at each station, a participant was re-measured to provide error data on actual participants during the course of the survey. These data were examined daily and analyzed weekly. If a measuring pair consistently exceeded the allowable observer error for a given dimension, the cause of the drift was determined and corrective action

taken. Thus, the allowable error values in a very real sense established the minimum reliability for the data collected in the survey.

8.1 OBSERVER ERROR IN ANTHROPOMETRIC LITERATURE

There are a number of different analytical methods and approaches to error analysis. A literature review of anthropometric error data revealed six approaches: analysis of variance (Bennett and Osborne, 1986; Jamison and Zegura, 1974; Kouchi et al., 1999; Utermohle and Zegura, 1982), correlation coefficients (Branson et al., 1982; Gordon and Bradtmiller, 1992; Jamison and Ward, 1993; Jamison and Zegura, 1974; Kouchi et al., 1996; Kemper and Pieters, 1974; Ulijaszek and Kerr, 1999; Ulijaszek and Lourie, 1994), mean differences (Branson et al., 1982; Gordon and Bradtmiller, 1992; Kouchi et al., 1996), technical error measurement (Branson et al., 1982; Cameron, 1984; Gordon and Bradtmiller, 1992; Goto and Mascie-Taylor, 2007; Harris and Smith, 2009; Jamison and Ward, 1993; Johnston and Mack, 1985; Kouchi et al., 1996; Ulijaszek and Kerr, 1999; Ulijaszek and Lourie, 1994; Utermohle and Zegura, 1982), paired T-tests (Albrecht, 1983; Utermohle and Zegura, 1982), 11 separate univariate measures (Utermohle et al., 1983), and various multivariate measures (Jamison and Zegura, 1974; Page, 1976; Utermohle et al., 1983). Utermohle and colleagues (1983) have observed: "There is no consensus concerning which statistical procedures are optimal or even important for the analysis of measurement error in physical anthropology." This literature review appears to bear that out.

Analysis of variance is a generally useful technique, which has often been applied to error data. Depending upon how it is applied, it can show how much of the measurement error is due to interobserver differences, how much to intraobserver differences and, where applicable, how much is due to the use of varying measurement methods or instruments. As Bennett and Osborne (1986) emphasize, analyses of variance are often used as a measure of differences between populations. Thus, when these analyses of variance can demonstrate statistically significant differences between groups as defined by measurers (interobserver error), the conclusions of a large number of studies showing anthropometric differences between populations should be questioned. This point is also made by Jamison and Zegura (1974) about multivariate techniques and by Page (1976) about principal components.

While the partitioning of error variance into interobserver and intraobserver components can be useful for population comparisons, and is of interest in its own right, it nevertheless has little to offer for the setting of permissible error levels in advance of data collection. Indeed in the present case, because the sample size is large, an analysis that relies solely on statistical significance must be regarded with extreme caution. What is needed in addition is a technique that examines observer differences in terms of the units of measurement.

A second analytical approach to error data is exemplified by Kemper and Pieters (1974). In that study, investigators compared nine measurements obtained on the same participants by measurers at two different research institutes in The Netherlands.

(An important distinction here is that the two teams were trained on the basis of the same written document, but were not trained by the same persons or trained with each other). The authors calculated the mean differences between measurements, including the sign (positive or negative) of the differences. Additionally, they calculated correlation coefficients between the two measurements. These ranged from 0.872 for Biacromial Diameter to 0.996 for Stature. A third value calculated in their study was a correlation coefficient between the difference (between the two measurements) and the mean of the two measurements. This last value was a measure of whether the difference increases with an increase in the absolute size of the measurement. Most correlation coefficients were not statistically different from zero, and all but three were less than 0.2. Here again, however, these values are useful in analyzing data after they have been collected, but are not directly applicable to setting maximum acceptable error levels in advance of data collection, or monitoring measurer performance during data collection.

This brief examination of the literature on the analysis of error data in anthropometric studies has shown that: there exists no consensus among researchers on an optimum method, there is considerable variability in the actual amount of error present in various studies, and setting levels of acceptable error before data collection is rare indeed. In terms of the task at hand, namely developing pre-set maximum acceptable error levels, two approaches to data analysis had merit. These were the calculation of mean values of differences between measurements when the sign had been removed and the calculation of the technical error of measurement. As both measures yielded similar values, the simpler mean absolute difference (MAD) was selected.

8.2 OBSERVER ERROR TEST

The vast majority of the traditional anthropometric dimensions measured in this study were duplicated from the 1987-1988 U.S. Army ANSUR (Gordon et al., 1989). The values established for the ANSUR survey were developed from three main sources: 1) the research literature, 2) examination of test/retest values from surveys in the Harry G. Armstrong Aerospace Medical Research Laboratory Anthropometric Data Bank, and 3) analysis of the results of an observer error test conducted using “experts” specifically for the ANSUR survey. For the ANSUR dimensions retained in the MC-ANSUR survey, there was no need to re-validate the allowable errors, since it was known in advance that the measurements could be reliably done and in every case the ANSUR actual observer errors were within the allowable error limits. Not all the dimensions to be measured in the MC-ANSUR survey were pre-validated by ANSUR, however. Anthrotech performed a new validation trial on a subset of MC-ANSUR dimensions for three reasons: 1) the dimension was new, 2) the ANSUR dimension was modified in some way, or 3) the actual observer errors in ANSUR suggested that the pre-set allowable errors could be lowered.

Validation trials were conducted over 2 days, using 10 participants and 4 experienced measurers, following the validation procedures first used in ANSUR

(Gordon et al., 1989; Hotzman et al., 2010). Each participant was measured twice—once in the morning and once in the afternoon—by each measurer for a total of eight values for each dimension. Landmarks were retained throughout the day, and refreshed after lunch as needed. The same procedure was repeated the following day on five different participants. For those dimensions that were new or for which it was proposed that the allowable error be adjusted, the MAD for each measurer was calculated and, in most cases, the largest MAD was chosen as the new recommended allowable error.

The new dimensions tested were:

Acromion-Wall Depth
Bicristal Breadth
Forearm-Center of Grip Length
Palm Length
Tibial Height
Tragion-Top of Head
Waist Front Length, Sitting

The established dimensions whose ANSUR allowable errors were thought to be too high were tested to determine if the errors could be lowered. These dimensions were:

Axilla Height	Head Circumference
Ball of Foot Length	Heel-Ankle Circumference
Bideltoid Breadth	Hip Breadth
Buttock Height	Lateral Malleolus Height
Calf Circumference	Neck Circumference, Base
Cervicale Height	Popliteal Height
Chest Breadth	Shoulder Circumference
Chest Circumference	Span
Chest Height	Stature
Ear Breadth	Trochanterion Height
Ear Protrusion	Waist Depth
Foot Breadth, Horizontal	Weight
Functional Leg Length	Wrist Circumference
Hand Circumference	

Finally, some measurements, including four from the list above, were modified for a number of reasons and re-tested.

Waist Circumference (Omphalion), Waist Breadth, Hip Breadth, Shoulder Circumference, and Buttock Circumference were tested to see if they could be reliably measured with only the key landmark marked—in other words, to determine whether the transferred landmarks could be eliminated. Thigh Clearance was tested to determine if a change in the foot platform would affect the measurement. The original

platform consisted of a foot board that was raised and lowered with screw jacks. The new platform consisted of a foot board that adjusted in height based on the number of Styrofoam squares placed underneath. Two methods of measuring Calf Circumference were tested. The first method involved moving the tape up and down the calf to locate the greatest circumference, marking the calf at that point, and taking the measurement at that level.

The second method was to identify the area that appeared to have the largest circumference, taking the measurement with the tape three times in that area, and recording the highest value. The remaining three dimensions (Foot Length, Ball of Foot Length, and Foot Breadth, Horizontal) traditionally involved the use of a foot box. Use of a Brannock device (the typical foot measuring apparatus seen in shoe stores) that had been modified to show metric scales instead of American shoe sizes was proposed. For all of these technique/instrument changes, both methods (the original ANSUR method and the proposed new method) were tested to ensure that 1) the resulting measurement values were the same and 2) the reliability (as measured by observer error) was the same or better.

8.3 RESULTS

The analysis of observer error—on new dimensions and on modified dimensions—was done for all dimensions in the validation study. The absolute differences between first and second measurements for each measurer are reported in Tables 22 and 23, along with the MAD for each dimension. Table 22 shows the new dimensions and those dimensions for which new allowable errors were proposed. Table 23 shows the interobserver differences for ANSUR dimensions proposed for modifications in measuring technique.

TABLE 22

Absolute Differences (ABS) of Dimensions by Measurer:
New Dimensions and Dimensions for Which New Allowable Errors Were Proposed
(values in mm and kg)

Dimension	ABS Means				Grand MAD
	Measurer 1	Measurer 2	Measurer 3	Measurer 4	
Acromion - Wall Depth	7.6	5.4	11.2	4.8	7.3
Axilla Height	7.5	6.4	5.9	7.4	6.8
Bicristal Breadth	4.2	10.7	9.3	5.6	7.5
Bideltoid Breadth	6.7	2.7	5.3	5.7	5.1
Buttock Height	2.8	2.7	2.7	4.4	3.2
Calf Circumference*	1.3	1.6	2.1	1.5	1.6
Cervicale Height	2.3	3.6	3.1	4.6	3.4
Chest Breadth	4.3	3.5	3.2	6.8	4.5
Chest Circumference	12.9	17.7	8	6.9	11.4
Chest Height	4.9	4.7	6.1	3.0	4.7
Ear Breadth	1.2	1.3	1.7	1.5	1.4
Ear Protrusion	2.3	2.6	1.8	2.0	2.2
Forearm-Center of Grip	3.1	3.2	6.9	6.7	5.0
Functional Leg Length	8.3	20.5	19.4	22.7	17.7
Hand Circumference	2.1	1.8	2.8	2.7	2.4
Head Circumference	2.2	2.0	3.4	4.2	3.0
Heel Ankle Circumference	2.0	2.5	1.9	1.7	2.0
Lateral Malleolus Height	1.0	0.7	1.7	1.2	1.2
Neck Circumference, Base	6.6	5.3	7.6	11.3	7.7
Palm Length	1.0	1.3	2	2.1	1.6
Popliteal Height	2.9	3.5	5.1	2.6	3.5
Span	7.8	6.1	5.1	5.9	6.2
Stature	2.4	3.6	3.6	4.2	3.5
Tibial Height	2.0	2.3	1.7	1.9	2.0
Trochanterion Height	4.3	3.3	8.8	6.6	5.7
Waist Depth (O)	7.0	5.5	7.6	4.9	6.3
Waist Front Length, Sitting	7.2	7.1	8.2	8.1	7.7
Weight	.40	.35	.34	.38	.37
Wrist Circumference	1.8	3.0	1.8	1.8	2.1

* Values from the proposed new technique for Calf Circumference.

TABLE 23

Absolute Differences (ABS) of Dimensions by Measurer: Modified Technique
(values in mm)

Dimension*	ABS Means				Grand MAD
	Measurer 1	Measurer 2	Measurer 3	Measurer 4	
Ball of Foot Length 2	0.7	1.4	1.8	0.7	1.2
Ball of Foot Length 1	1.6	1.3	1.2	1.2	1.3
Buttock Circumference 2	4.5	6.0	6.4	7.5	6.1
Buttock Circumference 1	5.2	4.9	5.2	4.0	4.8
Calf Circumference 2	1.3	1.6	2.1	1.5	1.6
Calf Circumference 1	1.3	2.0	1.0	1.0	1.3
Foot Breadth Horizontal 2	1.1	1.6	2.3	1.1	1.5
Foot Breadth Horizontal 1	1.4	1.1	1.2	1.5	1.3
Foot Length 2	1.2	1.9	1.0	0.7	1.2
Foot Length 1	1.1	1.2	1.2	1.4	1.2
Hip Breadth 2	4.0	2.6	6.4	4.9	4.5
Hip Breadth 1	2.6	5.5	3.7	2.3	3.5
Shoulder Circumference 2	11.3	18.2	7.9	6.6	11.0
Shoulder Circumference 1	6.4	6.1	6.3	5.8	6.2
Thigh Clearance 2	3.8	1.7	4.0	2.7	3.1
Thigh Clearance 1	3.6	2.1	3.7	3.2	3.2
Waist Breadth (O) 2	4.6	7.4	6.8	3.4	5.6
Waist Breadth (O) 1	4.9	3.5	4.1	2.8	3.8
Waist Circumference (O) 2	18.3	15.8	13.4	13.1	15.2
Waist Circumference (O) 1	3.8	6.6	7.1	6.6	6.0

* Variables listed with a "1" indicate the original measuring techniques; those listed with a "2" indicate proposed new measuring techniques.

For the dimensions in which a new instrument or new technique was tested, the individual measurement values were compared to determine whether or not the two instruments/techniques were comparable. Table 24 provides the measurement data for both techniques and the differences between them. The values shown in the table are the mean of the four measurers on their first trial. Note that the differences seen in Table 24 are not absolute differences, but they are signed differences, as it is useful to know whether a new method produces a larger, smaller or, on average, the same measurement.

TABLE 24

Measurements Tested for Technique/Instrument Modification: Mean over Four Measurers
(values in mm)

Dimension*	Participants										Overall Mean Difference (Signed)
	1	2	3	4	5	6	7	8	9	10	
Ball of Foot Length 2	183.3	172.4	169.6	200.1	175.5	202.0	197.5	198.4	197.6	206.1	
Ball of Foot Length 1	181.6	170.0	169.8	196.4	174.4	201.1	195.5	197.5	194.4	205.8	
Difference	1.6	2.4	-0.1	3.8	1.1	0.9	2.0	0.9	3.3	0.4	1.6
Calf Circumference 2 (3X)	347.6	347.9	335.6	380.6	392.5	341.1	361.8	371.6	391.3	338.9	
Calf Circumference 1	347.3	349.3	334.3	381.1	393.3	341.5	361.0	372.6	391.4	338.0	
Difference	0.4	-1.4	1.4	-0.5	-0.8	-0.4	0.8	-1.0	-0.1	0.9	-0.1
Foot Breadth Horizontal 2	89.0	94.8	88.5	97.0	92.1	98.4	97.5	98.5	96.3	105.6	
Foot Breadth Horizontal 1	89.4	92.6	85.6	98.0	92.6	96.3	96.1	94.8	94.9	103.6	
Difference	-0.4	2.1	2.9	-1.0	-0.5	2.1	1.4	3.8	1.4	2.0	1.4
Foot Length 2	249.4	242.3	228.4	269.0	241.5	272.6	265.8	263.5	263.5	278.4	
Foot Length 1	248.8	240.1	228.6	267.0	239.9	271.4	263.5	262.4	261.1	277.4	
Difference	1.0	2.1	-0.3	2.0	1.6	1.3	2.3	1.1	2.4	1.0	1.4
Thigh Clearance 2	141.9	154.9	152.8	172.6	159.5	163.6	167.8	168.9	191.4	166.5	
Thigh Clearance 1	142.5	155.6	151.1	174.3	160.5	164.8	166.8	171.5	193.3	165.0	
Difference	-0.6	-0.8	1.6	-1.6	-1.0	-1.1	1.0	-2.6	-1.9	1.5	-0.6

* Variables listed with a "1" indicate the original measuring techniques; those listed with a "2" indicate proposed new measuring techniques.

Transferring landmarks takes considerable time during landmarking, and it had been observed in the years since ANSUR that this process was sometimes carried out too quickly, with the result that the transferred landmarks were not on a horizontal line with the key landmark. In such cases the measurers had always been instructed to measure a horizontal circumference, even if it was not on the transferred mark. Therefore, in some studies, assessment of horizontality had been done on a visual basis, at the time of measurement. However, no test had been done to verify that a visual test was superior or inferior to transferred landmarks.

The five horizontal circumferences were tested to determine whether the investment of landmark transfer time had an effect on reliability. To test this question, the MADs between the two methods were compared. Table 25 lists these measurements and the differences between the observer errors under the old and new methods. In each case, the observer error increased, indicating that transferring the landmarks—even if it is an imperfect method—yields better data than not transferring the marks.

TABLE 25

Landmark Transfer/No Landmark Transfer Decision Summary
(values in mm)

Dimension	Difference Between MADs	Decision- Original or New
Buttock Circumference	1.3	Original
Hip Breadth	1.0	Original
Shoulder Circumference	4.8	Original
Waist Breadth	1.8	Original
Waist Circumference	9.2	Original

The decision to keep the original method for Hip Breadth was due to the need for the same transferred landmark for Buttock Circumference. This rationale also applied to Waist Breadth, i.e., the landmark is needed for Waist Circumference; therefore it will be used for Waist Breadth as well.

The dimensions involving a new technique or a new instrument were evaluated based on examining the differences between the two methods. Table 26 summarizes the decisions made based on these trials.

TABLE 26

New Technique/Instrument Decision Summary
(values in mm)

Dimension	Mean Difference	Decision – Original or New
Thigh Clearance	-0.55	New Method
Ball of Foot Length	1.61	New Instrument
Foot Length	1.41	New Instrument
Calf Circumference	-0.08	New Method
Foot Breadth, Horizontal	1.38	New Instrument

For Thigh Clearance, the new platform allows for quicker height adjustment. Although there are a number of seated dimensions which require the use of the foot platform, Thigh Clearance is the most sensitive with respect to the positioning of the legs. Thigh Clearance was used therefore as a proxy for all the seated dimensions requiring a foot platform. Since there is less than 1 mm difference between the two types of foot platform, the quicker method was used.

The new method for Calf Circumference involved taking three measurements and using the highest value as opposed to measuring the calf at the level of the calf landmark. There is less than 0.1 mm difference between the two methods. Since Calf Height was not measured as it was in ANSUR (requiring a calf landmark), the three-time method was used instead. Ultimately, by eliminating the need to establish the calf landmark, the somewhat lengthy new procedure for measuring Calf Circumference saved time.

For the three foot dimensions, the modified Brannock device was used in place of the foot boxes. For Foot Breadth, Foot Length and Ball of Foot Length, the Brannock device produced very slightly larger measurements, but the differences were less than the allowable error of 2 mm.

Proposed changes to the allowable error in the ANSUR dimensions were based on the experience of the ANSUR measurers over the course of the 11-month data collection. As noted above, in some cases the actual observer error was significantly lower than the allowable error, so the possibility of reducing the allowable error was explored. In most cases, the validation trials supported the proposed changes. The exceptions were: Ear Protrusion, Foot Breadth Horizontal, Functional Leg Length, Span, and Weight. Only one of the measurer's MADs for Ear Protrusion was below the proposed allowable error of 2 mm. The other three were all above, and two of the three were above the original allowable error of 3 mm. Thus the allowable error was retained at 3 mm. Functional Leg Length is a difficult dimension to measure repeatedly. A number of improvements had been made in standardizing the body position prior to measurement in order to improve repeatability, but three of the four experienced measurers were outside the original allowable error of 17 mm. Thus the allowable error for that dimension was not lowered. Finally, the validation trial data suggested that 0.2

kg was too small a window for Weight. The MADs of the four measurers ranged from 0.34 kg to 0.40 kg, with a grand mean of 0.37 kg. The original allowable error of 0.3 kg was retained.

For the new dimensions, the procedures in ANSUR for setting the allowable errors were generally followed. The ANSUR procedures for Bicristal Breadth would have produced an allowable error of 11 mm. Some improvements were made in the procedures (after the validation trial data collection) to reduce the observer error, and the provisional allowable error was set at 5 mm. Time did not permit a formal repeat of the validation trial to test whether this was reasonable. The improvements made some difference in the observer error, but probably not enough to justify the optimistic 5 mm value. It was later learned that the allowable error for this dimension in the Fels Longitudinal Study is set at 10 mm (Payne, personal communication, 2010). The MC-ANSUR allowable error for Bicristal Breadth was therefore adjusted to 8 mm.

Similarly, after the original validation trial for Acromion-Wall Depth, improvements were made in the procedures and the instrument was switched. Again, if the ANSUR allowable error procedures were followed, the setting for this would have been at 11 mm. It was provisionally lowered to 6 mm, based on improvements in technique; however, this was too optimistic, and the value was readjusted to 8 mm. The final list of new allowable errors is seen in Table 27.

The validation trial was useful in setting (and in some cases re-setting) the allowable errors to be used in evaluating data quality during the MC-ANSUR data collection. It also served, as such experiments often do, to highlight specific points in some measurement procedures that could be improved. Finally, it allowed testing of some new measurement methods against the original ANSUR methods, to determine whether the proposed new methods were equivalent. In cases where equivalence was shown, the switch was made to the new methods, which were generally faster. In other cases, it was shown that the faster method resulted in less reliable data. In those cases the original slower—but more reliable—method was retained.

TABLE 27

Tested Dimensions: Allowable Errors
(values in mm and kg)

Dimension	Allowable Error
Acromion-Wall Depth	8
Axilla Height	7
Ball of Foot Length	2
Bicristal Breadth	8
Buttock Height	4
Calf Circumference	4
Chest Breadth	7
Chest Circumference	14
Chest Height	9
Ear Breadth	2
Ear Protrusion	3
Foot Breadth, Horizontal	2
Forearm-Center of Grip Length	7
Functional Leg Length	17
Hand Circumference	3
Head Circumference	3
Heel-Ankle Circumference	4
Hip Breadth	6
Lateral Malleolus Height	2
Neck Circumference, Base	8
Palm Length	2
Popliteal Height	6
Shoulder Circumference	12
Span	10
Stature	6
Tibial Height	2
Tragion-Top of Head	4
Trochanterion Height	4
Waist Depth	6
Waist Front Length, Sitting	7
Weight	0.3
Wrist Circumference	3

8.4 DAILY OBSERVER ERROR

As noted in Chapter II, data collection was organized into half-day units. In each half day, each station measured one participant twice. Each station therefore had a total of 10 re-measure participants for each full week of measuring. The re-measure participants were always measured by a second measurer. Thus all data collected were interobserver data. At the end of each week, a weekly summary of re-measure data for each station was compiled. The MADs for the re-measured participants were evaluated. If the mean of the deltas exceeded the allowable error, the team supervisor met with the measurers at that station to determine the cause of the difficulty. Even when no mean delta exceeded the allowable error, however, the weekly summary was shown to the measurers so they could monitor their own performance over the course of the survey. Note that participants were also sent for repeat scans, but data from those scans were not examined during data collection, nor are they analyzed here.

Tables 28 through 38 show the means of the absolute values of the deltas for each measured dimension. The right-hand columns show the allowable error for each dimension. Dimensions are grouped by type. In each case, the MAD (observer error) was lower than the allowable error. The observer errors ranged from a low of 0.6 mm on the male Interpupillary Breadth to a high of 18.7 mm for the male Vertical Trunk Circumference (USA). Although the observer errors were always lower than the allowable errors, the larger observer errors were associated with dimensions which have the larger allowable errors. The standing heights (Table 28) generally had observer errors in the 2- to 6-mm range, with the exception of Crotch Height, which involves subjective judgment about the amount of pressure used. Errors in the sitting heights (Table 29) were somewhat higher, being generally in the 3- to 6-mm range; errors in Elbow Rest Height were higher, since it is sensitive to both arm and torso positioning.

TABLE 28

Observer Error for Standing Heights
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer* Error	n	Observer Error	
Acromial Height	92	6.2	51	4.1	7
Axilla Height	92	4.3	51	4.2	7
Buttock Height	94	2.4	47	2.2	4
Cervicale Height	92	3.0	51	2.6	7
Chest Height	94	5.7	47	5.8	9
Crotch Height	94	7.3	47	3.9	10
Iliocristale Height	92	3.0	51	2.6	5
Knee Height, Midpatella	94	2.6	47	2.3	6
Lateral Femoral Epicondyle Height	94	1.7	47	1.9	3
Lateral Malleolus Height	95	1.2	48	1.1	2
Stature	92	3.9	51	3.0	6
Suprasternale Height	92	4.3	51	3.7	5
Tenth Rib Height	92	2.8	51	2.6	5
Tibial Height	94	1.8	47	1.2	2
Trochanterion Height	94	2.8	47	3.7	4
Waist Height (Omphalion)	92	3.3	51	4.5	7
Wrist Height	92	5.8	51	5.5	11

*MAD

TABLE 29

Observer Error for Sitting Heights
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Elbow Rest Height	94	8.9	36	4.9	10
Eye Height, Sitting	94	6.3	36	4.1	8
Knee Height, Sitting	94	1.8	36	1.4	2
Popliteal Height	94	2.1	36	1.4	6
Sitting Height	94	5.6	36	3.8	6
Thigh Clearance	94	3.0	36	1.6	3
Waist Front Length, Sitting	94	6.6	36	4.3	7

The errors for body lengths (Table 30) ranged generally from 2 to 14 mm. The lower errors were associated with dimensions encompassing bony landmarks, e.g., Acromion-Radiale Length (2.1 mm males; 2.5 mm females). The higher errors were for dimensions involving soft tissue landmarks, e.g., Interscye II (8.3 mm males; 8.0 mm

females). Errors for both Crotch Lengths were relatively high because of variable tape tension and interference from the running shorts as the tape passes through the crotch. Functional Leg Length was also among the higher observer error dimensions; this can be attributed to the difficulty of achieving consistency in body position.

TABLE 30

Observer Error for Lengths
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Acromion-Radiale Length	92	2.1	51	2.5	4
Buttock-Knee Length	94	5.1	36	3.4	6
Buttock-Popliteal Length	94	5.9	36	4.8	7
Crotch Length (Omphalion)	94	11.0	47	8.1	18
Crotch Length, Posterior (Omphalion)	94	8.4	47	5.6	11
Forearm-Center of Grip Length	92	4.8	51	4.4	7
Forearm-Hand Length	92	1.9	51	1.5	4
Functional Leg Length	94	13.9	36	7.8	17
Interscye I	92	8.1	51	7.0	10
Interscye II	92	8.3	51	8.0	13
Radiale-Stylian Length	92	2.3	51	2.1	6
Shoulder-Elbow Length	92	2.2	51	3.0	6
Shoulder Length	92	2.4	51	2.5	3
Sleeve Length: Spine-Wrist	92	7.7	51	5.6	9
Sleeve Outseam	92	4.2	51	3.1	6
Waist Back Length (Omphalion)	92	3.6	51	3.0	5

Observer errors for breadths and depths (Tables 31 and 32, respectively) ranged generally from 2 to 6 mm. One exception was FOREARM-FOREARM BREADTH (13.9 mm males; 10.6 mm females), for which both body position and breathing cycle are important factors in measurement. The other exception was ACROMION-WALL DEPTH (8.0 mm males), which is greatly affected by body position. The large horizontal circumference errors (Table 33) ranged from 6 to 12 mm, while the vertical circumference errors ranged from 12 to 19 mm. The observer errors for small circumferences (Table 34), as a whole, ranged from 1 to 5 mm.

TABLE 31

Observer Error for Breadths
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Biacromial Breadth	94	4.6	36	3.6	8
Bicristal Breadth	94	5.6	47	4.5	8
Bideltoid Breadth	94	5.2	36	5.6	8
Bimalleolar Breadth	95	1.2	48	1.0	2
Chest Breadth	94	6.1	47	4.4	7
Forearm-Forearm Breadth	94	13.9	36	10.6	17
Hip Breadth	94	3.3	47	3.9	6
Hip Breadth, Sitting	94	4.3	36	3.7	6
Waist Breadth	94	3.9	47	3.4	6

TABLE 32

Observer Error for Depths and Weight
(values in mm and kg)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Abdominal Extension Depth, Sitting	94	6.2	36	4.5	10
Acromion-Wall Depth	94	8.0	36	5.4	8
Buttock Depth	94	5.9	47	4.5	8
Chest Depth	94	3.5	47	3.0	4
Waist Depth	94	4.3	47	2.8	6
Weight	92	0.2	51	0.1	0.3

TABLE 33

Observer Error for Large Circumferences
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Buttock Circumference	94	6.7	47	4.7	12
Chest Circumference	94	12.0	47	7.9	14
Shoulder Circumference	94	7.4	47	6.3	12
Vertical Trunk Circumference (USA)	94	18.7	47	12.1	24
Waist Circumference (Omphalion)	94	6.7	51	7.7	12

TABLE 34

Observer Error for Small Circumferences
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Ankle Circumference	95	1.1	48	1.1	4
Biceps Circumference, Flexed	92	2.9	51	4.2	6
Calf Circumference	95	1.8	48	1.5	4
Forearm Circumference, Flexed	92	3.0	51	2.0	5
Heel-Ankle Circumference	95	1.2	48	1.3	4
Lower Thigh Circumference	94	4.0	47	2.5	4
Neck Circumference	92	5.1	51	3.5	6
Neck Circumference, Base	92	4.0	51	3.1	8
Thigh Circumference	94	4.9	47	3.7	6
Wrist Circumference	92	1.7	51	1.5	3

Observer errors for the head (Table 35), hand (Table 36), and foot dimensions (Table 37) were generally quite low. All were less than 3 mm, and most approached 1 mm, the smallest unit to which these measurements are recorded. These dimensions are small in magnitude, and body position and breathing cycle generally do not affect their measurement. The reaches (Table 38), on the other hand, are the most sensitive of all dimensions to body positioning difficulties. The observer errors for most reaches ranged from 8 to 14 mm.

TABLE 35

Observer Error for Head Dimensions
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Bitracion Chin Arc	95	1.9	48	2.0	8
Bitracion Submandibular Arc	95	2.6	48	2.5	6
Bizygomatic Breadth	95	1.0	48	1.1	2
Ear Breadth	95	0.8	48	1.3	2
Ear Length	95	0.9	48	1.1	2
Ear Protrusion	95	0.9	48	1.1	3
Head Breadth	95	0.8	48	0.9	2
Head Circumference	95	1.9	48	1.6	3
Head Length	95	0.9	48	1.0	2
Interpupillary Breadth	95	0.6	48	0.8	2
Menton-Sellion Length	95	1.2	48	1.2	3
Tracion-Top of Head	95	1.5	48	1.4	4

TABLE 36

Observer Error for Hand Dimensions
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Hand Breadth	95	1.2	48	1.1	2
Hand Circumference	95	1.4	48	1.2	3
Hand Length	95	1.4	48	1.2	3
Palm Length	95	1.0	48	1.1	2

TABLE 37

Observer Error for Foot Dimensions
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Ball of Foot Circumference	95	1.5	48	1.2	4
Ball of Foot Length	95	1.2	48	0.9	2
Foot Breadth, Horizontal	95	1.1	48	1.0	2
Foot Length	95	1.1	48	1.1	3
Heel Breadth	95	1.1	48	1.1	2

TABLE 38

Observer Error for Reach Dimensions
(values in mm)

Dimension	Males		Females		Allowable Error
	n	Observer Error	n	Observer Error	
Overhead Fingertip Reach, Sitting	94	13.8	36	7.3	20
Span	94	8.2	36	6.6	10
Thumbtip Reach	94	10.4	36	8.1	20

The allowable errors were of considerable value in monitoring the progress of training. In the past, the assessment of whether team members were ready to begin data collection was subjective. In the MC-ANSUR, there was a fixed standard, the allowable error, which told both trainers and team members alike when the team was ready to begin actual data collection. Allowable errors also aided in maintaining measurement standards and avoiding measurer drift over the course of a long data collection period. This was of critical importance because the MC-ANSUR survey took place over 5 months, with as much as 1 to 2 weeks between some measuring sites.

A potential disadvantage of establishing maximum allowable errors in advance is that team members might strive to achieve that level of interpair comparability and then stop trying to improve. As many of the mean observer errors were considerably lower than the allowable errors, however, this appears not to have been the case in this survey. It remains a potential difficulty, though, in cases where team motivation is a problem.

Observer error measured on a daily basis, as was done in this survey, has two advantages. First, because observer error data are collected throughout the survey, the data collected can be assumed to be "real", i.e., not an artifact of the team making special efforts for a single day of re-measured participants. Second, the daily checking can be used to detect measurement technique problems as soon as they arise, and they can be corrected before the problems become entrenched in the data.

On the other hand, there are two disadvantages to daily collection of observer error data, although they are believed to be outweighed by the advantages. First, the re-measure participants, who are generally not especially pleased to be measured in the first place, are even less pleased to be measured again. This is generally not a significant problem with military participants who are accustomed to following orders. Second, time spent measuring participants a second time is time not spent measuring new participants, but this is a small price to pay for the assurance of data quality gained by including the daily error checks. No modifications in this approach to daily observer error data collection are recommended.

8.5 ESTIMATED OBSERVER ERROR FOR DERIVED DIMENSIONS

Observer error for derived dimensions obviously has no place in correcting problems of measurement technique, since these dimensions are not calculated until the survey is completed. However, because the observer error data are useful in assessing statistical significance tests or in analyzing or developing sizing systems and laying out workstations, it is helpful to know the magnitude of the observer error of these dimensions, even after the fact.

Since direct calculation of observer error for the derived dimensions was not generally possible, an alternative strategy was employed. It consisted of estimating observer error using the observer error of the component dimensions. Most of the derived dimensions are calculated by adding or subtracting values of other dimensions. For these dimensions, the observer error is estimated as less than or equal to the sum of the MADs of all component dimensions. Note that addition is used whether the component dimensions are added or subtracted to create the derived dimension. For Clavicle Link, which is created by dividing Biacromial Breadth by two, the observer error is estimated by dividing the observer error of Biacromial Breadth by two.

A model derivation, showing how the observer error for derived dimensions can be estimated using the MAD of component dimensions is shown below for two types of calculation (Gordon et al., 1989). The first is a derived dimension created by

subtraction. The same demonstration could be used for dimensions created by addition alone, by two subtractions, or by a combination of additions and subtractions. The second shows how the observer error for Clavicle Link can be calculated from the MAD of Biacromial Breadth.

Let z be the calculated dimension and x and y be the measured dimensions.

$$z = x - y \quad MAD(z) = ?$$

$$MAD(z) = MAD(x - y)$$

$$= \frac{\sum_{i=1}^n |(x_{1i} - y_{1i}) - (x_{2i} - y_{2i})|}{n}$$

where x_{1i} , x_{2i} , y_{1i} , y_{2i} ($i = 1 \dots n$), are the measurements for the i th individual and x_{1i} , y_{1i} are measurements for observer 1.

$$= \frac{\sum_{i=1}^n |(x_{1i} - x_{2i}) - (y_{1i} - y_{2i})|}{n}$$

$$\leq \frac{\sum_{i=1}^n |(x_{1i} - x_{2i})| + \sum_{i=1}^n |(y_{1i} - y_{2i})|}{n}$$

$$\leq \frac{\sum_{i=1}^n |(x_{1i} - x_{2i})|}{n} + \frac{\sum_{i=1}^n |(y_{1i} - y_{2i})|}{n}$$

$$\leq MAD(x) + MAD(y)$$

$$\therefore MAD(z) \leq MAD(x) + MAD(y)$$

Let r be the calculated dimension and w be the measured dimension.

$$r = \frac{w}{2} \quad MAD(r) = ?$$

$$MAD(r) = MAD\left(\frac{w}{2}\right)$$

$$= \frac{\sum_{i=1}^n \left| \left(\frac{w_{1i}}{2} - \frac{w_{2i}}{2} \right) \right|}{n}$$

$$= \frac{1}{2} \frac{\sum_{i=1}^n |(w_{1i} - w_{2i})|}{n}$$

$$= \frac{1}{2} MAD(w)$$

$$\therefore MAD(r) = \frac{1}{2} MAD(w)$$

The estimated observer errors for all derived dimensions are shown in Table 39. These values can be used for the same purposes as observer errors of measured dimensions, although the user should keep in mind that the derived dimension measurements are estimated rather than measured values.

TABLE 39

Estimated Observer Error for Derived Dimensions
(values in mm)

Derived Dimension	Males	Females
Abdominal Link	5.8	5.2
Acromial Height, Sitting	15.7	10.9
Acromion-Axilla Length	10.5	8.3
Arm Length	13.4	10.8
Axilla-Waist Length (Omphalion)	7.6	8.7
Calf Link	2.9	3.0
Cervicale Height, Sitting	12.5	9.4
Chest Height, Sitting	15.2	12.6
Chest-Waist Drop (Omphalion)	18.7	15.6
Clavicle Link	2.3	1.8
Crotch Length, Anterior (Omphalion)	19.4	13.7
Dactylion Height	7.2	6.7
Dactylion Reach from Wall	10.4	8.1
Elbow Rest Height, Standing	18.4	11.7
Elbow-Wrist Length	3.3	2.7
Eye Height	15.8	10.9
Functional Grip Reach	10.4	8.1
Index Finger Reach	10.4	8.1
Neck-Buttock Length	5.4	4.8
Neck Link	8.4	7.0
Neck-Scye Length	7.3	6.8
Pelvic Link	5.8	6.3
Rise (Omphalion)	10.6	8.4
Shoulder-Waist Length (Omphalion)	9.5	8.6
Sleeve Inseam	10.1	9.7
Suprasternale Height, Sitting	13.8	10.5
Suprasternale-Tenth Rib Length	7.1	6.3
Suprasternale-Waist Length (Omphalion)	7.6	8.2
Thigh Link	4.5	5.6
Thorax Link	5.8	5.2
Tragion Height	5.4	4.4
Tragion Height, Sitting	7.1	5.2
Vertical Grip Reach	23.3	14.1
Vertical Grip Reach Down	12.0	9.6
Vertical Grip Reach, Sitting	15.2	8.5
Vertical Index Fingertip Reach	23.3	14.1
Vertical Index Fingertip Reach, Sitting	13.8	7.3
Vertical Thumbtip Reach, Sitting	13.8	7.3
Waist Back, Vertical (Omphalion)	6.3	7.1
Waist-Buttock Drop (Omphalion)	13.4	12.4
Waist-Waist (Omphalion) Over Shoulder	29.7	20.2

8.6 TECHNICAL ERROR OF MEASUREMENT AND RELIABILITY COEFFICIENT

There are other methods for analyzing observer data. Two commonly seen in the literature are the technical error of measurement (TEM) and the reliability coefficient (R). Technical error of measurement expresses error in terms of the unit of measurement using the following formula:

$$TEM = \sqrt{\frac{\sum D^2}{2N}}$$

where D is the difference between the first and second measurements and N is the number of individuals measured. As can be seen from the formula, the technical error is basically a way of summarizing differences between two measurements over a series of participants (Ulijaszek and Lourie, 1994).

The reliability coefficient (R) reveals how much of the variation between participants in the measured population is free of measurement error (Ulijaszek and Lourie, 1994). R is calculated as follows:

$$R = 1 - \left\{ \frac{(TEM)^2}{(SD)^2} \right\}$$

where SD is the standard deviation of the measured values. Since R is dimensionless, it can be used to make comparisons between variables that have different magnitudes (Gordon and Bradtmiller, 1992).

Due to the high correlation between TEM and MAD (Utermohle et al., 1983), using both methods is potentially redundant (Gordon and Bradtmiller, 1992); however, due to the ubiquitous use of TEM and R in the literature, it may be helpful to some readers to include both of the statistics that are included in this report for comparative purposes. Tables 40 through 50 report TEM and R for the dimensions measured in MC-ANSUR. In general, the relative magnitude of TEM, and inversely, R, corresponds to that of the MAD seen in the previous tables and varies with dimension type in the same way.

TABLE 40

TEM and R for Standing Heights
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Acromial Height	4.56	99.5	3.81	99.5
Axilla Height	4.06	99.5	3.95	99.4
Buttock Height	2.22	99.8	1.76	99.8
Cervicale Height	2.69	99.8	2.44	99.8
Chest Height	5.29	99.2	5.07	99.0
Crotch Height	6.62	97.9	3.34	99.3
Iliocristale Height	2.90	99.7	2.57	99.7
Knee Height, Midpatella	2.62	99.1	2.13	99.2
Lateral Femoral Epicondyle Height	1.59	99.6	1.67	99.5
Lateral Malleolus Height	1.16	97.3	0.92	98.3
Stature	3.40	99.8	2.87	99.8
Suprasternale Height	3.88	99.6	3.44	99.6
Tenth Rib Height	2.64	99.8	2.36	99.7
Tibial Height	1.75	99.5	1.11	99.8
Trochanterion Height	2.71	99.7	4.24	99.0
Waist Height (Omphalion)	3.09	99.6	4.06	99.2
Wrist Height	5.22	98.5	5.16	98.1

TABLE 41

TEM and R for Sitting Heights
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Elbow Rest Height	6.88	93.8	4.19	97.4
Eye Height, Sitting	4.45	98.3	3.75	98.5
Knee Height, Sitting	1.54	99.7	1.10	99.8
Popliteal Height	1.44	99.7	1.29	99.6
Sitting Height	4.21	98.6	2.56	99.4
Thigh Clearance	1.93	98.1	1.31	98.8
Waist Front Length, Sitting	6.26	94.1	3.77	97.1

TABLE 42

TEM and R for Lengths
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Acromion-Radiale Length	1.86	98.8	2.14	98.1
Buttock-Knee Length	3.70	98.5	2.95	99.0
Buttock-Popliteal Length	4.42	97.3	4.53	96.8
Crotch Length (Omphalion)	9.94	94.7	6.49	97.0
Crotch Length, Posterior (Omphalion)	7.61	92.2	5.30	96.2
Forearm-Center of Grip Length	3.72	95.5	4.13	93.6
Forearm-Hand Length	1.93	99.3	1.51	99.5
Functional Leg Length	10.92	96.2	6.40	98.2
Interscye I	7.56	94.8	6.60	94.5
Interscye II	7.83	92.8	7.57	90.8
Radiale-Styilion Length	2.20	97.8	1.86	98.1
Shoulder-Elbow Length	2.07	98.6	2.50	97.6
Shoulder Length	2.34	95.1	2.48	93.9
Sleeve Length: Spine-Wrist	7.60	96.2	4.85	98.0
Sleeve Outseam	3.89	98.3	3.01	98.7
Waist Back Length (Omphalion)	3.44	98.4	2.69	98.9

TABLE 43

TEM and R for Breadths
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Biacromial Breadth	3.20	97.4	3.31	95.9
Bicristal Breadth	5.47	90.2	3.96	95.8
Bideltoid Breadth	4.21	97.7	4.87	95.2
Bimalleolar Breadth	1.10	92.0	0.91	92.4
Chest Breadth	6.04	88.3	3.79	94.7
Forearm-Forearm Breadth	9.88	95.5	8.80	93.2
Hip Breadth	2.89	98.3	3.03	98.2
Hip Breadth, Sitting	4.13	85.4	3.40	98.5
Waist Breadth	3.62	98.5	2.80	98.9

TABLE 44

TEM and R for Depths and Weight
(values in mm and kg)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Abdominal Extension Depth, Sitting	4.85	97.0	4.51	97.0
Acromion-Wall Depth	6.59	85.0	4.31	93.3
Buttock Depth	5.73	93.0	4.27	95.4
Chest Depth	3.20	97.8	2.55	98.6
Waist Depth	4.53	96.9	2.45	99.0
Weight	0.26	100.0	0.30	99.9

TABLE 45

TEM and R for Large Circumferences
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Buttock Circumference	5.68	99.3	3.88	99.6
Chest Circumference	10.65	98.0	6.50	99.0
Shoulder Circumference	6.72	98.7	5.01	98.8
Vertical Trunk Circumference (USA)	17.80	94.9	9.59	98.0
Waist Circumference (Omphalion)	5.95	99.6	4.85	99.6

TABLE 46

TEM and R for Small Circumferences
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Ankle Circumference	1.08	99.4	0.94	99.4
Biceps Circumference, Flexed	2.52	99.3	3.72	97.1
Calf Circumference	2.57	99.1	1.32	99.7
Forearm Circumference, Flexed	2.61	98.4	2.00	98.1
Heel-Ankle Circumference	1.05	99.6	1.04	99.4
Lower Thigh Circumference	3.64	98.5	2.11	99.3
Neck Circumference	3.68	97.1	2.99	96.5
Neck Circumference, Base	3.92	96.8	2.36	98.1
Thigh Circumference	4.25	99.4	3.42	99.4
Wrist Circumference	1.52	96.6	1.31	96.2

TABLE 47

TEM and R for Head Dimensions
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Bitragion Chin Arc	1.79	98.3	1.72	98.2
Bitragion Submandibular Arc	2.27	97.6	2.34	96.4
Bizygomatic Breadth	0.90	97.7	0.87	97.2
Ear Breadth	0.80	91.3	1.22	74.3
Ear Length	0.86	95.4	0.91	94.3
Ear Protrusion	0.82	93.0	0.94	90.3
Head Breadth	0.85	97.5	0.84	96.7
Head Circumference	2.43	97.4	1.35	99.4
Head Length	0.98	97.9	0.87	98.5
Interpupillary Breadth	0.50	97.8	0.68	95.5
Menton-Sellion Length	1.03	97.6	1.03	97.4
Tragion-Top of Head	1.23	96.4	1.27	95.2

TABLE 48

TEM and R for Hand Dimensions
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Hand Breadth	0.99	94.9	0.94	93.5
Hand Circumference	1.42	97.9	1.00	98.4
Hand Length	1.17	98.5	1.07	98.6
Palm Length	0.97	97.6	0.96	97.0

TABLE 49

TEM and R for Foot Dimensions
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Ball of Foot Circumference	1.36	98.9	0.99	99.1
Ball of Foot Length	1.08	98.9	0.84	99.2
Foot Breadth, Horizontal	0.92	97.0	0.87	96.3
Foot Length	1.02	99.4	0.94	99.4
Heel Breadth	1.05	95.2	0.93	95.5

TABLE 50

TEM and R for Reach Dimensions
(values in mm)

Dimension	Males		Females	
	TEM	R (%)	TEM	R (%)
Overhead Fingertip Reach, Sitting	14.02	94.8	5.94	99.0
Span	6.81	99.3	5.57	99.4
Thumbtip Reach	9.16	94.5	8.48	93.4

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CHAPTER IX

REFERENCES

(Includes references from Appendices B and G)

Albrecht GH (1983) Humidity as a Source of Measurement Error in Osteometrics. *American Journal of Physical Anthropology*. 60:517-521.

Bennett KA, Osbourne RH (1986) Interobserver Measurement Reliability in Anthropometry. *Human Biology*. 58(5):751-759.

Blackwell S, Robinette KM, Boehmer M, Fleming S, Kelly S, Brill T, Hoeflerlin D, Burnsides D, Daanen H (2002) *Civilian American and European Surface Anthropometry Resource (CAESAR), Final Report, Volume II: Descriptions*. Technical Report AFRL-HE-WP-TR-2002-0173, Human Effectiveness Directorate, Crew Systems Interface Division, Wright-Patterson Air Force Base, OH.

Bolton CB, Kenward M, Simpson RE, Turner GM (1973) *An Anthropometric Survey of 2000 Royal Air Force Aircrew 1970/1971*. Technical Report 73083, Royal Air Force Establishment, Farnborough, Hants, England.

Bradtmiller B, Ratnaparkhi J, Tebbetts I (1985) *Demographic and Anthropometric Assessment of U.S. Army Anthropometric Data Base*. Technical Report TR86-004 (DTIC Number: ADA164637). U.S. Army Natick Research, Development, and Engineering Center, Natick, MA.

Bradtmiller B, Gordon CC, Paquette SP (2009) Anthropometric change in the U.S. Army: Implications for design. In: *Human Diversity*, Proceedings of the 9th International Congress of Physiological Anthropology. Delft, The Netherlands: International Association of Physiological Anthropology. 48-51.

Branson RS, Vaucher YE, Harrison GG, Vargas M, Thies C (1982) Inter- and Intra-observer Reliability of Skinfold Thickness and Newborn Infants. *Human Biology*. 54:137-143.

Cameron N (1984) *The Measurement of Human Growth*. Croom Helm: London, England.

Centers for Disease Control and Prevention (CDC) 2012 National Center for Health Statistics (NCHS). *National Health and Nutrition Examination Survey Examination Protocol*. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.
http://www.cdc.gov/nchs/data/nhanes/nhanes_09_10/BodyMeasures_09.pdf.

Churchill E, Churchill T, McConville JT, White RM (1977) *Anthropometry of Women of the U.S. Army--1977: Report No. 2 - The Basic Univariate Statistics*. Technical Report

NATICK-TR-77/024 (AD A044 806). U.S. Army Natick Research and Development Command, Natick, MA.

Churchill E, Kikta P, Churchill T (1977) *The AMRL Anthropometric Data Bank Library: Volumes I-V*. Technical Report AMRL-TR-77-1(AD A047 314). Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, OH.

Churchill E, McConville JT, Laubach LL, White RM (1971) *Anthropometry of U.S. Army Aviators - 1970*. Technical Report TR-72-52-CE (AD 743528). U.S. Army Natick Laboratories, Natick, MA.

Churchill T, Bradtmiller B, Gordon CC (1988) *Computer Software Used in the U.S. Army Anthropometric Survey 1987-1988*. Technical Report (TR-88-045)(ADA201185). U.S. Army Natick Research, Development and Engineering Center, Natick, MA.

Clauser CE, McConville JT, Gordon CC, Tebbetts I (1986) *Selection of Dimensions for an Anthropometric Data Base Volume II: Dimension Evaluation Sheets*. Technical Report (TR-86/054) (AD A179 472). U.S. Army Natick Research, Development and Engineering Center, Natick, MA.

Clauser CE, Tucker PE, McConville JT, Churchill E, Laubach L, Reardon J (1972) *Anthropometry of Air Force Women*. Technical Report AMRL-TR-70-5 (AD 743 113). Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, OH.

DMDC: Defense Manpower Data Center (2010) *Marine Corps Strength by Component, Gender, Age and Race/Ethnicity Type*. DRS 27795_Gordon_1003.

Donelson SM, Gordon CC (1996) *Validation of a Statistical Matching Procedure Used to Create United States Marine Corps Anthropometric Databases*. Technical Report (TR-96-035) (ADA316645). U.S. Army Natick Research, Development and Engineering Center, Natick, MA.

Dunn OJ (1961) Multiple Comparisons Among Means. *Journal of the American Statistical Association*. 56:52-64.

Gentsch, EL, Moody, AC, Vandenberghe, JJ (2000) *Operational Baseline of the MCRD-San Diego 3-D Scanner Implementation*, Contractor Technical Report delivered to Defense Logistics Agency, Fort Belvoir, VA.

Gifford EC, Provost JR, Lazo J (1965) *Anthropometry of Naval Aviators - 1964*. Aerospace Crew Equipment Laboratory Report No. NAEC ACEL 533. U.S. Naval Air Engineering Center, Philadelphia, PA.

Gordon CC (1988) ANSUR 1988 Reporting Rates, unpublished data.

Gordon CC (2011) MC-ANSUR Reporting Rates, unpublished data.

Gordon CC, Bradtmiller B (1992) Interobserver Error in a Large Scale Anthropometric Survey. *American Journal of Human Biology*. 4:253-263.

Gordon CC, Bradtmiller B, Clauser CE, Churchill T, McConville JT, Tebbetts I, Walker RA (1989) *1987-1988 Anthropometric Survey of U.S. Army Personnel: Methods and Summary Statistics*. Technical Report (TR-89-044) (ADA225 094). U.S. Army Natick Research, Development and Engineering Center, Natick, MA.

Gordon CC, Paquette SP, Bradtmiller B (2008) *Anthropometric Change in the U.S. Army: 1987-2007*. Paper presented at the 33rd Annual Meeting of the Human Biology Association, 9-10 April 2008, Columbus, OH. Abstract published in *American Journal of Human Biology* V20(2): 222.

Goto R, Mascie-Taylor CGN (2007) Precision of Measurement as a Component of Human Variation. *Journal of Physiological Anthropology*. 26(2):253-256.

Grotepass J, Speyer H, Kaiser R (2002) Generation and use of human 3D-CAD models. *SPIE*. 4537:501-504.

Han H, Nam Y, Choi K (2010) Comparative Analysis of 3D Body Scan Measurements and Manual Measurements of Size Korea Adult Females. *International Journal of Industrial Ergonomics*. 40: 530-540.

Harris EF, Smith RN (2009) Accounting for Measurement Error: A Critical but often Overlooked Process. *Archives of Oral Biology*. 54S:S107-S117.

Hotzman J, Bradtmiller B, Kristensen K (2010) *ANSURII/MC-ANSUR Validation Trials for New and Modified Dimensions*. Technical Report. U.S. Army Soldiers Systems Center, Natick, Natick, MA. (in press)

Hotzman J, Gordon CC, Bradtmiller B, Corner BD, Mucher M, Kristensen S, Paquette S, Blackwell C (2011) *Measurer's Handbook: US Army and Marine Corps Anthropometric Surveys, 2010-2011*. Technical Report NATICK/TR-11/017. U.S. Army Natick Soldier Research, Development and Engineering Center, Natick, MA.

ISO 7250-1:2008 *Basic human body measurements for technological design -- Part 1: Body measurement definitions and landmarks*. International Organization for Standardization, Geneva.

ISO 15535:2006 *General requirements for establishing anthropometric databases*. International Organization for Standardization, Geneva.

ISO 20685:2010 *3-D scanning methodologies for internationally compatible anthropometric databases*, International Organization for Standardization, Geneva.

Jamison PL, Ward RE (1993) Brief Communication: Measurement Size, Precision, and Reliability in Craniofacial Anthropometry: Bigger is Better. *American Journal of Physical Anthropology*. 90(4):495-500.

Jamison PL, Zegura SL (1974) A Univariate and Multivariate Examination of Measurement Error in Anthropometry. *American Journal of Physical Anthropology*. 8:417-426.

Johnston FE, Mack RW (1985) Interobserver Reliability of Skinfold Measurements in Infants and Young Children. *American Journal of Physical Anthropology*. 67:285-289.

Kemper HCG, Pieters JJJ (1974) Comparative Study of Anthropometric Measurements on the Same Subjects in Two Different Institutes. *American Journal of Physical Anthropology*. 40:341-344.

Kouchi M, Mochimaru M (2006) Why Scan-Derived Body Measurements Differ From Measurements by the Traditional Methods? *Proceedings IEA 2006 Congress*. pg5.

Kouchi M, Mochimaru M, Tsuzuki K, Yokoi T (1996) Random Errors in Anthropometry. *Journal of Human Ergology*. 25:155-166.

Kouchi M, Mochimaru M, Tsuzuki K, Yokoi T (1999) Interobserver errors in anthropometry. *Journal of Human Ergology*. 28:15-24.

Martin R (1914) *Lehrbuch Der Anthropologie*. JENA Verlag von Gustav Fischer.

McCann C, Noy I, Rodden E, Logan O (1975) *1974 Anthropometric Survey of Canadian Forces Personnel*. DCIEM Report No. 75-R-1114. Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada.

Page JW (1976) A Note on Interobserver Error in Multivariate Analysis of Populations. *American Journal of Physical Anthropology*. 44:521-526.

Paquette S (1996) 3D Scanning in Apparel Design and Human Engineering. *IEEE Computer Graphics and Applications*. 16(5):11-15.

Paquette S, Gordon CC, Bradtmiller B (2009) *Anthropometric Survey (ANSUR) II Pilot Study: Methods and Summary Statistics*. Technical Report (TR-09-014). U.S. Army Natick Research, Development and Engineering Center, Natick, MA.

Payne J, personal communication (2010).

Perkins T, Burnsides DB, Robinette KM, Naishadham, D (2000) *Comparative Consistency of Univariate Measures from Traditional and 3-D Scan Anthropometry*. SAE international Paper Number 2000-01-2145.

Smith-Lopez D, Bradtmiller B (2005) *JSLIST Tariff Verification Report for the Joint Project Management Office for Individual Protection*.

Sokal RR, Rohlf FJ (1994) *Biometry: The Principles and Practices of Statistics in Biological Research, 3rd Edition*. New York: W.H. Freeman.

Ulijaszek SJ, Kerr DA (1999) Anthropometric Measurement Error and the Assessment of Nutritional Status. *British Journal of Nutrition*. 82:165-177.

Ulijaszek SJ, Lourie JA (1994) Intra- and Inter-Observer Error in Anthropometric Measurement. In Eds (Ulijaszek SJ, Mascie-Taylor CGN) *Anthropometry: The Individual and the Population*. Cambridge: Cambridge University Press. Vol 14: 30-55.

US Census Bureau (2011) *Statistical Abstract of the United States: 2011*.
<http://www.census.gov/compendia/statab/2011/tables/11s0009.pdf>.

Utermohle CJ, Zegura SL (1982) Intra- and Interobserver Error in Craniometry: A Cautionary Tale. *American Journal of Physical Anthropology*. 8:417-426.

Utermohle CJ, Zegura SL, Heathcote GM (1983) Multivariate Observers, Humidity, and Choice of Precision Statistics: Factors Influencing Craniometric Data Quality. *American Journal of Physical Anthropology*. 61:85-95.

White RM, Churchill E (1971) *The Body Size of Soldiers*. U.S. Army Anthropometry - 1966. Technical Report 72-51-CE (AD 743 465). U.S. Army Natick Laboratories, Natick, MA.

White RM, Churchill E (1977) *United States Marine Corps Anthropometry*. Technical Report (TR-78-021). U.S. Army Natick Research, Development and Engineering Center, Natick, MA.

Yin X, Corner BD, Razdan A (2009) EARS: A System for Geometric and Anthropometric Evaluation of Human Body Scans. *Computer-Aided Design and Applications*. 6:431-445. DOI: 10.3722/cadaps.2009.431-445.

Yin X, Corner BD, Razdan A (2010) EARS: Toward Fast Analysis of 3D Human Scans. *Advances in Applied Digital Human Modeling*, V. Duffy, ed. CRC Press, Taylor & Francis Group.

Zar JH (2009) *Biostatistical Analysis, 5th Edition*. Prentice Hall: Englewood Cliffs, NJ.

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APPENDIX A

APPLICATIONS FOR MEASURED AND DERIVED DIMENSIONS

Most of the measured and derived dimensions for which data are reported in this volume serve multiple design and sizing uses. Some, chiefly head, hand, and foot variables, are needed for the design of a particular class of item to be worn on that part of the body. All the dimensions serve at least one of the seven use categories described below:

Describing Overall Body Size and Proportions: These are dimensions of overall body size and proportions. They are required to determine the anthropometric differences or similarities between populations. They are also used for selecting samples of participants that are anthropometrically representative of a particular population for studies in which body size is of significance (e.g., the evaluation of the workstation layouts for a new armored vehicle). Further, these dimensions are commonly used in anthropometric studies world-wide, and their definitions are generally agreed upon. This means that international population comparisons using these dimensions are valid.

Clothing and Personal Protection Design, Sizing, and Issue: These dimensions are useful for the design and sizing of Marine uniforms, utility garments, and personal protective equipment (e.g., body armor, respirators, chemical defense clothing). In this context, “personal protection” also includes boots, gloves, helmets, goggles and various special purpose items.

Workstation Design: Dimensions in this group are central to the design and layout of single- and multi-person workstations occupied by military personnel. They are also of paramount importance in the design and layout of workstations of weapon systems, particularly those, like tanks, in which space is at a premium. Body clearance dimensions dictate, for example, the size of escape hatches and limited-size passageways that must be designed to allow quick and safe passage of an individual. In the field or in a depot, the performance of maintenance activities is also greatly enhanced if personnel have ready physical and visual access to maintenance and inspection ports, and have the reach capabilities to perform necessary service, repair, or replacement activities, often conducted under adverse conditions.

Occupational Selection: These dimensions are used to screen candidates for anthropometric incompatibility when job assignments are being made. The physical constraints inherent in some occupations, e.g. the dimensions of a helicopter cockpit, preclude individuals of certain sizes and proportions from safely carrying out those missions.

Digital Human Models: These dimensions are needed for developing digital human models used to assess the body’s reaction to hazardous environments, and for two- and three-dimensional models used in the design and evaluation of Marine Corps

crewstations and workstations. Digital models are increasingly used in the design process for seated and standing workstations, as well as group modeling for battlefield scenarios.

3-D Scan Validation: The dimensions in this group are those required to create and refine automated scan data extraction algorithms. As scanners are more frequently used as a substitute for actual anthropometric data collection, it becomes more critical than ever to assure users of the data that the measurements arising from 3-D scans are equivalent to those taken with tapes and calipers. As data extraction applications are continuously improving, this is a foreseeable goal. In the interim, however, it is necessary to collect traditional (tape & caliper) dimensions that can be used to test the validity of these applications and the assumptions and the algorithms that underlie them.

International Standards for Ergonomic Design: These dimensions are useful for comparing data sets between nations, and are measured according to the protocol in ISO 7250-1, as well as other international standards. Further, these dimensions form part of a minimum set of dimensions recommended for collection any time humans are measured. The inclusion of these dimensions ensures that the U.S. is using internationally recognized "Best Practices" in its survey design.

Table A-1 lists all the measured and derived dimensions in the MC-ANSUR survey and designates the use or uses each may serve.

TABLE A-1

Applications for Measured and Derived Dimensions *

Measured or Derived Dimension	Describing Overall Body Size and Proportions	Clothing and Personal Protection Design, Sizing, and Issue	Workstation Design	Occupational Selection	Digital Human Models	3-D Scan Validation	International Standards for Ergonomic Design
1 Abdominal Extension Depth, Sitting			✓	✓			✓
D1 Abdominal Link					✓		
2 Acromial Height		✓			✓	✓	✓
D2 Acromial Height, Sitting			✓		✓		
D3 Acromion- Axilla Length		✓					
3 Acromion-Radiale Length	✓				✓	✓	✓
4 Acromion-Wall Depth							✓
5 Ankle Circumference	✓	✓			✓		
D4 Arm Length	✓						
6 Axilla Height		✓			✓		✓
D5 Axilla-Waist Length (Omphalion)		✓					
7 Ball Of Foot Circumference		✓					
8 Ball Of Foot Length		✓			✓		✓
9 Biacromial Breadth	✓	✓	✓		✓	✓	✓
10 Biceps Circumference Flexed	✓	✓			✓		
11 Bicristal Breadth			✓		✓		
12 Bideltoid Breadth	✓		✓	✓	✓	✓	✓
13 Bimalleolar Breadth	✓				✓		
14 Bitracion Chin Arc		✓					
15 Bitracion Submandibular Arc		✓					
16 Bizygomatic Breadth	✓	✓		✓	✓	✓	
17 Buttock Circumference	✓	✓		✓	✓	✓	✓
18 Buttock Depth			✓		✓		
19 Buttock Height	✓	✓			✓	✓	
20 Buttock-Knee Length			✓	✓	✓		✓
21 Buttock-Popiteal Length			✓	✓	✓		✓
22 Calf Circumference	✓	✓			✓	✓	✓
D6 Calf Link					✓		
23 Cervicale Height	✓	✓		✓	✓	✓	✓
D7 Cervicale Height, Sitting							

* After Clauser et al., 1986

Measured or Derived Dimension	Describing Overall Body Size and Proportions	Clothing and Personal Protection Design, Sizing, and Issue	Workstation Design	Occupational Selection	Digital Human Models	3-D Scan Validation	International Standards for Ergonomic Design
24 Chest Breadth	✓	✓			✓		
25 Chest Circumference	✓	✓		✓	✓	✓	✓
26 Chest Depth	✓		✓		✓		✓
27 Chest Height		✓			✓	✓	
D8 Chest Height, Sitting		✓					
D9 Chest-Waist Drop (Omphalion)		✓					
D10 Clavicle Link					✓		
28 Crotch Height	✓	✓		✓	✓		✓
D11 Crotch Length Anterior (Omphalion)		✓					
29 Crotch Length Omphalion		✓			✓		
30 Crotch Length Posterior Omphalion		✓					
D12 Dactylon Height			✓		✓		
D13 Dactylon Reach From Wall			✓		✓		
31 Ear Breadth	✓	✓				✓	
32 Ear Length	✓	✓				✓	
33 Ear Protrusion		✓					
34 Elbow Rest Height			✓		✓		✓
D14 Elbow Rest Height, Standing			✓		✓		✓
D15 Elbow-Wrist Length			✓		✓		
D16 Eye Height			✓		✓		✓
35 Eye Height, Sitting	✓		✓	✓	✓		✓
36 Foot Breadth Horizontal	✓	✓		✓	✓		✓
37 Foot Length	✓	✓	✓	✓	✓		✓
39 Forearm Circumference Flexed		✓			✓		
38 Forearm-Center Of Grip Length		✓			✓		
40 Forearm-Forearm Breadth			✓	✓	✓		✓
41 Forearm-Hand Length	✓		✓		✓		✓
D17 Functional Grip Reach			✓		✓		✓
42 Functional Leg Length				✓	✓		
43 Hand Breadth	✓	✓	✓		✓		✓
44 Hand Circumference	✓	✓		✓	✓		✓
45 Hand Length	✓	✓	✓	✓	✓		✓
46 Head Breadth	✓	✓		✓	✓		✓
47 Head Circumference	✓	✓		✓	✓		✓
48 Head Length	✓	✓		✓	✓		✓

Measured or Derived Dimension	Describing Overall Body Size and Proportions	Clothing and Personal Protection Design, Sizing, and Issue	Workstation Design	Occupational Selection	Digital Human Models	3-D Scan Validation	International Standards for Ergonomic Design
49 Heel Ankle Circumference		✓					
50 Heel Breadth	✓	✓					
51 Hip Breadth	✓		✓		✓	✓	✓
52 Hip Breadth, Sitting	✓		✓	✓	✓		✓
53 Iliocristale Height		✓			✓	✓	
D18 Index Finger Reach			✓		✓		
54 Interpupillary Breadth		✓			✓		
55 Interscye I		✓			✓		
56 Interscye II		✓			✓		
57 Knee Height Midpatella		✓			✓		
58 Knee Height, Sitting	✓		✓	✓	✓		✓
59 Lateral Femoral Epicondyle Height	✓				✓		
60 Lateral Malleolus Height		✓			✓		
61 Lower Thigh Circumference		✓		✓	✓	✓	
62 Menton-Sellion Length	✓	✓		✓	✓		
D19 Neck-Buttock Length		✓					
63 Neck Circumference	✓	✓			✓	✓	✓
64 Neck Circumference Base		✓		✓	✓	✓	✓
D20 Neck Link					✓		
D21 Neck-Scye Length		✓					
65 Overhead Fingertip Reach, Sitting			✓	✓	✓		
66 Palm Length		✓			✓		✓
D22 Pelvic Link					✓		
67 Popliteal Height			✓	✓	✓		✓
68 Radiale-Styilion Length	✓				✓	✓	✓
D23 Rise (Omphalion)		✓					
69 Shoulder Circumference	✓	✓			✓	✓	
70 Shoulder-Elbow Length			✓	✓	✓		✓
71 Shoulder Length		✓			✓		
D24 Shoulder-Waist Length (Omph)		✓					
72 Sitting Height	✓		✓	✓	✓		✓
D25 Sleeve Inseam		✓					
73 Sleeve Length Spine-Wrist		✓					
74 Sleeve Outseam	✓	✓		✓			✓
75 Span	✓		✓	✓	✓		✓

Measured or Derived Dimension	Describing Overall Body Size and Proportions	Clothing and Personal Protection Design, Sizing, and Issue	Workstation Design	Occupational Selection	Digital Human Models	3-D Scan Validation	International Standards for Ergonomic Design
76 Stature	✓	✓	✓	✓	✓	✓	✓
77 Suprasternale Height	✓				✓		
D26 Suprasternale Height, Sitting		✓			✓		
D27 Suprasternale-Tenth Rib Length		✓			✓		
D28 Suprasternale-Waist (Omph) Length		✓			✓		
78 Tenth Rib Height					✓		
79 Thigh Circumference	✓	✓		✓	✓	✓	✓
80 Thigh Clearance			✓	✓	✓		✓
D29 Thigh Link					✓		
D30 Thorax Link					✓		
81 Thumbtip Reach	✓		✓	✓	✓		✓
82 Tibial Height					✓		✓
D31 Tragion Height					✓		
D32 Tragion Height, Sitting					✓		
83 Tragion-Top Of Head	✓	✓			✓		
84 Trochanterion Height	✓				✓		✓
D33 Vertical Grip Reach			✓		✓		
D34 Vertical Grip Reach Down			✓		✓		✓
D35 Vertical Grip Reach, Sitting			✓		✓		
D36 Vertical Index Fingertip Reach			✓		✓		
D37 Vertical Index Fingertip Reach, Sitting			✓		✓		
D38 Vertical Thumbtip Reach, Sitting			✓		✓		
85 Vertical Trunk Circumference (USA)		✓		✓	✓		✓
86 Waist Back Length Omphalion		✓			✓		
D39 Waist Back, Vertical (Omphalion)		✓					
87 Waist Breadth	✓				✓		
88 Waist Circumference Omphalion	✓	✓			✓	✓	✓
89 Waist Depth					✓		
90 Waist Front Length, Sitting		✓					
91 Waist Height Omphalion	✓	✓			✓		
D40 Waist-Buttock Drop (Omphalion)		✓					
D41 Waist-Waist (Omph) Over Shoulder		✓					
92 Weight	✓	✓	✓	✓	✓		✓
93 Wrist Circumference	✓	✓			✓		✓
94 Wrist Height			✓		✓		

APPENDIX B

SAMPLING STRATEGY FOR THE MC-ANSUR DATABASE

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This appendix describes the methods used to establish minimum sampling requirements for the USMC databases, including component/sex/age/race sample cell targets developed by U.S. Army Natick Soldier Research, Development, and Engineering Center (NSRDEC), the sample acquisition strategy used by the USMC, and the MC-ANSUR subject acquisition results. In addition to a description of sampling methods and results, this appendix includes a discussion of the strengths and limitations of the MC-ANSUR databases and a critical review of lessons learned.

B.1 DETERMINING MINIMUM SAMPLE SIZES

Initial discussions with Marine Corps Systems Command (MARCORSYSCOM) indicated that they desired a database that included males and females of both Active and Reserve Components. Anthropometric sizing and design methods require that male and female data be treated separately in most statistical analyses, so power analyses for both men and women were conducted to ensure sufficient sample sizes to accurately describe design requirements for each sex whenever appropriate. In addition, since no comparative studies of Marine Active and Reserve Components had been previously conducted, it was impossible to know if the Components had significantly different body size/shape distributions. This required sampling sufficient numbers of Marine Reserves to determine whether they also needed to be treated separately in anthropometric sizing and design requirements and models.

An approach similar to that used in the 1988 ANSUR survey was used to establish minimum sample sizes for the MC-ANSUR databases. This approach involves identification of the statistical parameters and tests commonly required of engineering databases, definition of the desired confidence and precision of those parameter estimates and tests, and estimation of the sample sizes required to achieve the desired level of confidence and precision. A “worst case” scenario—the most difficult (in terms of sample size required) statistic for the most variable body dimension—is used to set the minimum sample size for the database as a whole to ensure that the minimum requirements for all other less demanding statistical tests and less variable body dimensions are automatically met. For most engineering databases, the most challenging parameter estimates are the 5th and 95th percentiles, which are commonly used to establish accommodation boundaries in military design and sizing requirements. Statistical estimation of means is also commonly done as part of statistical approaches to design in order to center sizing systems at the densest part of the user distribution. In general, the sample sizes needed to obtain a given level of

precision and confidence in statistics at the tails of body size distributions are far larger than those needed to estimate the center of the distribution.

Equation 1 is a simplified expression of the minimum sample size required for estimation of 5th/95th percentiles with 95% confidence and a precision of 1% of the mean value (Sokal & Rohlf, 1994; ISO 15535:2006). Equation 2 gives the minimum sample sizes needed to estimate mean values with 95% confidence and a 1% precision (Sokal & Rohlf, 1994; ISO 15535:2006; Zar, 2009).

$$\text{Equation 1: } n \geq (1.96 \cdot CV)^2 \cdot (1.534)^2$$

$$\text{Equation 2: } n \geq (1.96 \cdot CV)^2$$

where n = minimum sample size, and CV = Coefficient of Variation = (Standard Deviation/Mean) * 100.

As can be seen above, minimum sample sizes for 5th/95th percentiles are larger than those needed for the same precision/confidence in means by a factor of approximately $1.534^2 = 2.4$. Knowing average values precisely, however, is not sufficient to design military systems that must accommodate a broad range of body sizes and shapes. Design envelopes such as those used in military requirements documents require relatively precise estimates at the tails of the body size distributions. For this reason, the 5th/95th percentile requirements (Equation 1) usually set minimum sample sizes for reference engineering databases; such minimums will be sufficient for defining accommodation envelopes and more than sufficient for other statistical applications.

Because correlations between body dimensions are so important in multivariate modeling and anthropometric sizing and design, it is impractical to have different sample sizes for different dimensions. Ideally all dimensions should be measured on all survey participants, even though body dimensions with lower CVs theoretically require smaller sample sizes to obtain reliable percentile estimates. Again, a worst case approach is taken by choosing those critical body dimensions with the highest CVs to establish minimum sample sizes, knowing that the results will be more than sufficient for less variable body dimensions.

Previous military surveys have shown that of the most commonly used body dimensions, the two with the largest CVs (therefore requiring the largest sample sizes for precise parameter estimates) are Waist Circumference and Chest Circumference. Table B-1 presents estimates of Marine Corps Waist and Chest Circumference means and standard deviations from two sources: the 1994 USMC mini-survey (Donelson and Gordon, 1996) and the 2004 JSLIST Fit Test (Smith-Lopez and Bradtmiller, 2005). As can be seen in Table B-1, USMC Waist and Chest Circumferences were more variable in the 2004 study than in the 1994 study. As Army samples have also shown an increase in variance over the last decades (Gordon et al, 2008; Bradtmiller et al, 2009),

it was concluded that the higher variance in 2004 was not unusual, and the 2004 statistics were chosen to establish minimum sample sizes for MC-ANSUR.

TABLE B-1

Waist and Chest Circumference Statistics from Previous USMC Surveys

Males						
Dimension	2004 (n=938)			1994 (n=493)		
	Mean	SD	CV	Mean	SD	CV
Waist Circumference	87.95	9.41	10.7	86.68	8.21	9.5
Chest Circumference	100.91	7.89	7.8	100.66	7.20	7.2
Females						
Dimension	2004 (n=62)			1994 (n=470)		
	Mean	SD	CV	Mean	SD	CV
Waist Circumference	81.59	8.30	10.2	77.54	6.94	9.0
Chest Circumference	93.32	6.46	6.9	92.57	5.99	6.5

When CVs are calculated from the 2004 values in Table B-1 and inserted into power equations (1, 2) above, the following results (Table B-2) were obtained.

TABLE B-2

Minimum Sample Sizes for MC-ANSUR

Dimension		Males		Females	
		Mean	5th/95th	Mean	5th/95th
Waist Circumference	n ≥	440	1035	398	936
Chest Circumference	n ≥	235	553	184	433

As expected, the sample requirements for precise estimates of the mean were substantially lower than those needed to determine 5th/95th percentiles with the same confidence and precision. In addition, there was a substantial difference in the sample sizes needed for parameter estimates of Waist Circumference (CVs 10.2 and 10.7) than for Chest Circumference (CVs 6.9 and 7.8). Unfortunately, Waist Circumference is a very important measurement for clothing and protective equipment design, and so it cannot be ignored. On the other hand, the vast majority of dimensions in the MC-ANSUR database do not require a sample size that high. A pragmatic compromise was reached by rounding down the minimum female sample size to 900 and using it for both males and females. A target of 900 Marines for each sex will provide 5th/95th percentile estimates of Waist Circumference with precisions of 1.07% and 1.02% of the mean for males and females respectively (instead of the desired 1.0%) and better precision for less variable body dimensions. Note that the differences between the desired 1.0% precision and the actual 1.02% and 1.07% precisions are less than 1 mm, which is negligible for all practical purposes. The initial sampling targets for MC-ANSUR were

thus set at $n=900$ each for male and female, Active and Reserve databases, and plans were made to measure approximately 3600 Marines.

B.2 ESTABLISHING REPRESENTATIVE SAMPLING TARGETS

Previous anthropometric research has demonstrated that most anthropometric variation is explained by age, sex, and population affiliation (Bradtmiller et al., 1985; ISO 15535). A stratified sampling strategy based on component, sex, age, and racial/ethnic group was thus used to guide subject acquisition in MC-ANSUR so that the resulting samples would be demographically and anthropometrically representative of the Corps. Defense Manpower Data Center census counts from 31 March 2010 (DRS 27795_Gordon_1003) were used to establish age and racial/ethnic frequencies for each component/sex database, and these age/race proportions expressed in databases of 900 Marines each are shown in Table B-3. Note that USMC Reserve females are not shown in Table B-3 because they were so few in number (~1,900 in March of 2010) that creating a separate database with $n \geq 900$ for Reserve females was not logistically feasible even if it was theoretically desirable.

B.3 SAMPLE ACQUISITION PLANNING

Deriving representative sampling targets from statistical power equations and user-population census data is a relatively easy process compared to the logistical challenge of executing a stratified random sampling strategy in the field. Accessing anthropometric survey participants in military settings requires coordination with liaison personnel from measuring sites and units, and implementation of a participant selection process that does not bias the sample and its resulting anthropometric distributions. Potential sources of bias in military samples include limited geographic and operational representation at measuring sites and participating military units, biases in unit availability that increase the probability of sampling personnel from noncombat occupational groups and units, and an age/rank participation bias that makes representative sampling of older age groups extremely challenging.

Recent large-scale Army surveys such as ANSUR (Gordon et al., 1989) and ANSUR II addressed potential sample acquisition biases in several ways: measuring sites were chosen to sample a cross section of Combat Divisions and geographic locations; units at measuring sites were sampled according to military function to ensure a cross section of combat, combat support, and combat service support occupational groups; and whole units were assembled for subject screening or screened virtually (using unit rosters) so that survey participants could be randomly selected from within sex/age/racial-ethnic sampling strata. Such approaches require a very high level of military commitment to the project, which includes (1) unwavering General Officer support, (2) formal military taskings that cascade from HQ to participating units, and (3) full-time assignment of at least one military liaison officer and non-commissioned officer (NCO) to travel with the measuring team, coordinate survey requirements with local chains of command at each measuring site, and to troubleshoot sample acquisition on a daily basis.

TABLE B-3

MC-ANSUR Representative Sample Requirements

Active Duty Males							
Ages	White	Black	Hispanic	Asian	Native Am	Pacific Islander	All Other
≤20	147	15	22	4	1	2	3
21-25	284	31	47	8	2	4	15
26-30	99	16	22	3	1	2	8
31-40	82	19	19	3	1	1	6
41-65	21	5	3	0	0	0	1

Active Duty Females							
Ages	White	Black	Hispanic	Asian	Native Am	Pacific Islander	All Other
≤20	149	33	32	5	2	4	7
21-25	235	55	69	9	5	5	22
26-30	79	23	29	4	1	1	11
31-40	47	23	18	4	2	1	5
41-65	10	6	3	0	0	0	1

Reserve Males							
Ages	White	Black	Hispanic	Asian	Native Am	Pacific Islander	All Other
≤20	125	14	17	6	1	1	3
21-25	303	27	43	15	2	3	19
26-30	100	12	23	5	1	1	9
31-40	70	11	18	3	1	1	7
41-65	43	5	5	1	1	0	4

Apart from ensuring that sample acquisition is not biased, a primary reason for obtaining high-level support, military taskings, and full time assignment of military liaison officers/NCOs, is to ensure a steady flow of survey participants so that the measuring team is fully occupied every day that it is in the field. This is important because access to measuring sites and military units through formal tasking channels usually requires coordination six months or more in advance, so that measuring dates at a given site are essentially “written in stone.” Further, the highly trained measuring team is contracted (and paid) for those dates whether or not military personnel are available to measure. As a result, if participants fail to arrive, arrive too late to be fully measured, or must leave for another mission before they have completed the measuring process, the

project experiences *unrecoverable* sampling losses that reduce the overall sample size of the database.

B.4 MC-ANSUR SAMPLE ACQUISITION PLAN

Sample acquisition planning was led by MARCORSYSCOM personnel, with direct military liaison support from the Program Manager Infantry Combat Equipment (PM ICE) office. Three measuring sites were chosen: Marine Corps Bases (MCB) Quantico, Camp LeJeune, and Camp Pendleton. Unit taskings were initially coordinated at an O-5/6 (LtCol/Col) level, but required General Officer intervention to successfully complete negotiations. The resulting survey plan allowed for 13.5 days of measuring at Quantico, 18 days of measuring at Camp LeJeune, and 47.5 days of measuring at Camp Pendleton—a potential capacity of 3,950 Marines given the measuring team’s processing rate of 25 Marines in each half day measuring session.

The minimum demographic requirements for representative samples in Table B-3 were split proportionally among the measuring sites so that each tasking office could independently determine how to meet their requirements. The actual selection and assignment of survey participants to measuring dates and a.m./p.m. measuring sessions was left to local tasking offices in order to maximize their capability to support multiple missions while addressing survey sampling requirements. In addition, tasking offices were asked to select survey participants with Military Occupation Specialties (MOSs) in the following Marine Air-Ground Task Force (MAGTF) Element proportions (Table B-4):

TABLE B-4

Desired Proportions of MAGTF Elements in MC-ANSUR Sample

Quantico/NCR		I and II MEF	
		Command Element	10%
Ground Combat Element	50%	Ground Combat Element	40%
Aviation Combat Element	20%	Aviation Combat Element	20%
Logistics Combat Element	30%	Logistics Combat Element	30%

B.5 MC-ANSUR SAMPLE ACQUISITION RESULTS

Table B-5 shows the results of subject acquisition efforts for MC-ANSUR. Capacity refers to the number of Marines who could have been measured given the number of measuring sessions scheduled at each location and a confirmed measuring team rate of 25 per session when participants arrived as scheduled. The reporting rate refers to the percentage of Marines scheduled by their tasking offices who actually reported for survey participation. Measured refers to the number of Marines actually measured. Percentage of capacity is the number of Marines measured divided by the number who could have been measured. Note that the percentage of capacity

achieved is systematically higher than the reporting rate because more subjects (30) are requested for each measuring session than can actually be measured (25) in case there are “no shows” or withdrawals from the survey. This was done because rostering survey participants to report at a later time is an invariably riskier method to fill measuring sessions than is physical screening of whole units where subjects are selected and then immediately transported to the measuring site.

TABLE B-5

Sample Acquisition Results for MC-ANSUR

Site	Capacity	Reporting Rate	Measured	Percentage of Capacity
Camp LeJeune	900	64.4%	665	73.9%
Camp Pendleton	2375	41.5%	1093	46.0%
Quantico	675	22.3%	163	24.1%
TOTAL	3950	43.4%	1921	48.6%

As can be seen in Table B-5, only 1,921 Marines were measured in MC-ANSUR, when 3,600 were planned, and up to 3,950 were possible. The low reporting rates of Marine Reservists at the first two sites caused unrecoverable sampling losses that made measurement of a valid Reserve sample unfeasible without compromising the project’s ability to achieve valid Active Duty databases. Even concentrating on Active Duty alone, MC-ANSUR was able to measure only 621 of the 900 females required for optimal statistical power. Fortunately, many body dimensions in the database are less variable than those used in the power analysis, and a sample of more than 600 may be adequate for most engineering applications provided that there are no biases in the female MC-ANSUR sample.

Sampling biases are always a concern, and especially so in any kind of survey research with low “response” rates. Ordinarily one might assess potential response bias by comparing the demographics, occupations, and military experience of subjects who reported for measurement against the same data for subjects who did not report after being selected. If the distributions are similar, then there would be little reason to believe that the low reporting rates biased the databases. Unfortunately, however, demographic data on individuals who did not report for MC-ANSUR measuring were not available for analysis because all details concerning Marines selected for participation (including the methods used to select them) were handled privately by local USMC tasking offices.

In short, it cannot be known if any sampling biases were introduced into the MC-ANSUR databases as a result of low reporting rates. It is clear from the age distributions reported in Table 6 that MC-ANSUR oversampled younger Marines and undersampled older Marines—a pattern that is commonly seen in military studies without high level, tasked support. The relatively high percentage of MC-ANSUR

participants who were never deployed (45% males, 58% females—see Table 13) also suggests that the individuals selected/reporting for MC-ANSUR may not have been typical of the Marine Corps as a whole.

B.6 LESSONS LEARNED

The reporting rates in MC-ANSUR were significantly lower than in other military surveys—past and current—with which the authors are familiar. ANSUR 1988 had reporting rates that varied between 80% and 94%, when using the same rostering method as MC-ANSUR (Gordon, unpublished data 1988). ANSUR II (ongoing, and with the same measuring team and measurement/scanning protocols as MC-ANSUR) achieved 92-96% of capacity at its first few U.S. Army Forces Command (FORSCOM) posts using a combination of whole company screening and rostering of HQ personnel (Gordon, unpublished data 2011).

Several factors may have contributed to the low attendance rates in MC-ANSUR. First, it goes without saying that conducting a study like this during wartime is extremely challenging, and with a smaller population and fewer measuring locations, the USMC has fewer options in meeting sampling goals than the Army does. That said, the sample acquisition strategy pursued by MARCORSYSCOM in MC-ANSUR differed in several important ways from anthropometric surveys with higher accession rates. ANSUR II, for example, is being executed under an HQDA Executive Order (EXORD) that was coordinated through the Army G-3 and G-4 offices well over nine months in advance of data collection; drafted and coordinated with subordinate commands six months in advance of data collection, and finalized four months in advance. This approach allowed the project team to brief General Officers whose commands were impacted by the study and to work directly with their tasking offices who ultimately selected the survey measuring sites and dates. ANSUR II has also had the benefit of a full time O-5 liaison officer assigned from the project's inception, and full time O-3 and E-8 liaisons assigned to be present in the field every day with the measuring team, whereas MC-ANSUR had a succession of project officers assigned during planning phases, and a single MC liaison officer assigned during data collection who had other project responsibilities in addition to MC-ANSUR.

An HQDA EXORD, like a USMC Operations Order (OPORD), is no guarantee of timely and enthusiastic local cooperation for any anthropometric survey. But a full-time liaison team such as the Army assigned to ANSUR II enables top-down briefings and courtesy calls to selected units that minimize misunderstandings and tasking conflicts. The presence of military liaisons on site also enables immediate troubleshooting and better chance of recovery with minimal sampling losses when participating units or individuals go missing. These approaches also served the Army well during the ANSUR survey in 1988 and, given the attendance issues that arose in MC-ANSUR when lower level, less intensive coordination methods were utilized, they seem important to consider in future studies where foundational data for materiel systems design and acquisition are being generated.

B.7 REFERENCES*

Bradtmiller B, Ratnaparkhi J, Tebbetts I (1985) *Demographic and Anthropometric Assessment of U.S. Army Anthropometric Data Base*. Technical Report TR86-004 (DTIC Number: ADA164637). U.S. Army Natick Research, Development, and Engineering Center, Natick, MA.

Bradtmiller B, Gordon CC, Paquette SP (2009) Anthropometric change in the U.S. Army: Implications for design. In: *Human Diversity*, Proceedings of the 9th International Congress of Physiological Anthropology. Delft, The Netherlands: International Association of Physiological Anthropology. 48-51.

Donelson SM, Gordon CC (1996) *Validation of a Statistical Matching Procedure Used to Create United States Marine Corps Anthropometric Databases*. Technical Report (TR-96-035) (ADA316645). U.S. Army Natick Research, Development and Engineering Center, Natick, MA.

Gordon CC, Bradtmiller B, Clauser CE, Churchill T, McConville JT, Tebbetts I, Walker RA (1989) *1987-1988 Anthropometric Survey of U.S. Army Personnel: Methods and Summary Statistics*. Technical Report (TR-89-044) (ADA225 094). U.S. Army Natick Research, Development and Engineering Center, Natick, MA.

Gordon CC, Paquette SP, Bradtmiller B (2008) *Anthropometric Change in the U.S. Army: 1987-2007*. Paper presented at the 33rd Annual Meeting of the Human Biology Association, 9-10 April 2008, Columbus, OH. Abstract published in *American Journal of Human Biology* V20(2): 222.

ISO 15535:2006 *General requirements for establishing anthropometric databases*. International Organization for Standardization, Geneva.

Smith-Lopez D, Bradtmiller B (2005) *JSLIST Tariff Verification Report for the Joint Project Management Office for Individual Protection*.

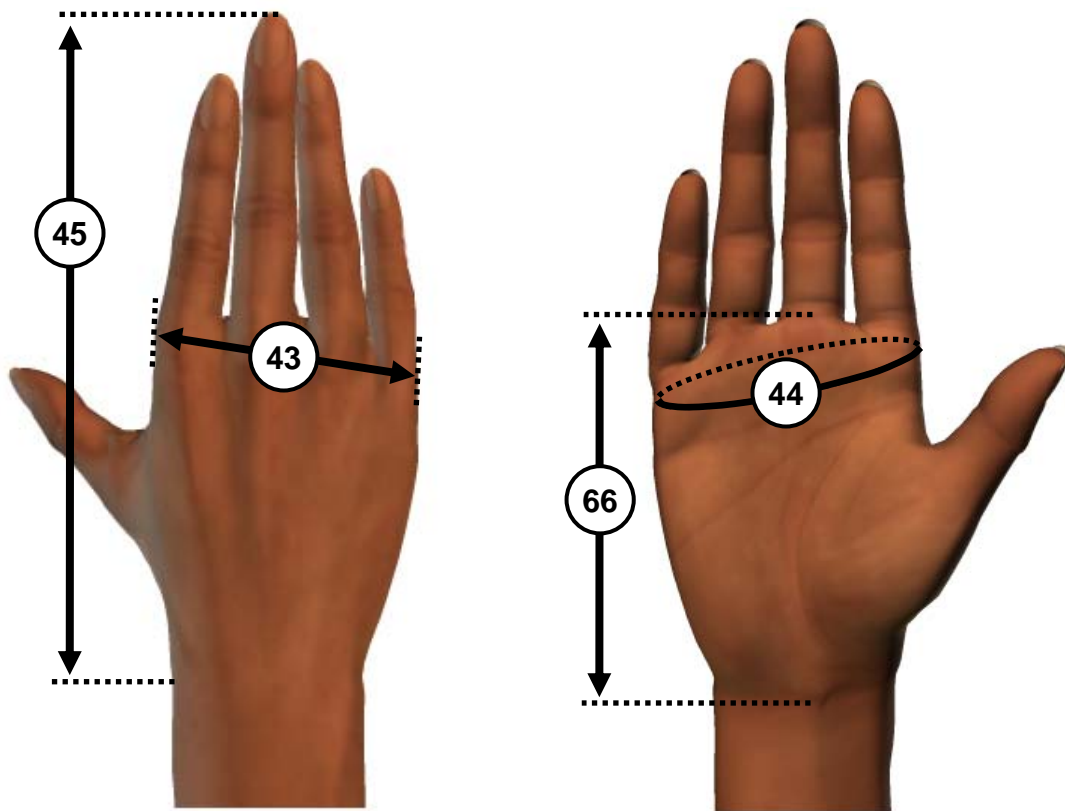
Sokal RR, Rohlf FJ (1994) *Biometry: The Principles and Practices of Statistics in Biological Research*, 3rd Edition. New York: W.H. Freeman.

Zar JH (2009) *Biostatistical Analysis*, 5th Edition. Prentice Hall: Englewood Cliffs, NJ.

* The references for this appendix are included here for ease of use, but are also included in the main References section.

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APPENDIX C
VISUAL INDEX OF BODY MEASUREMENTS

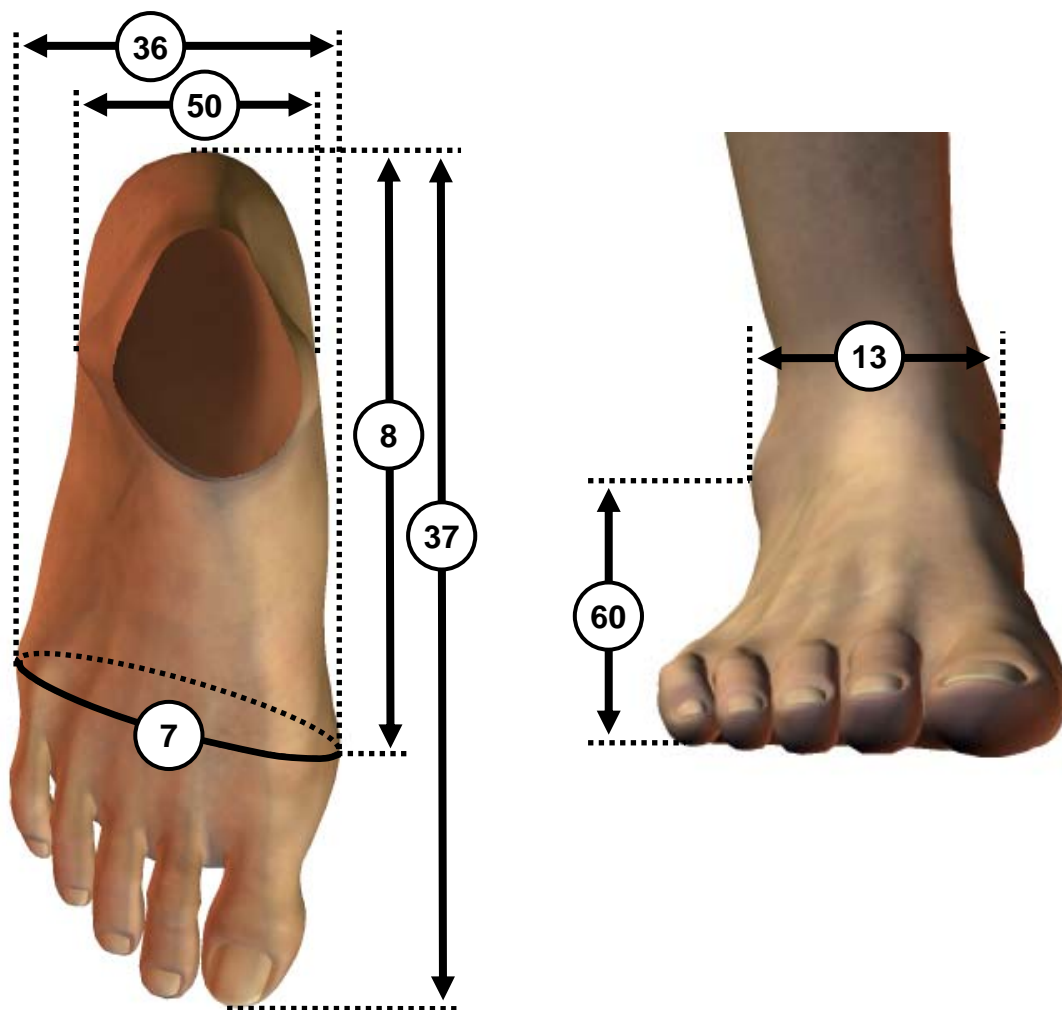


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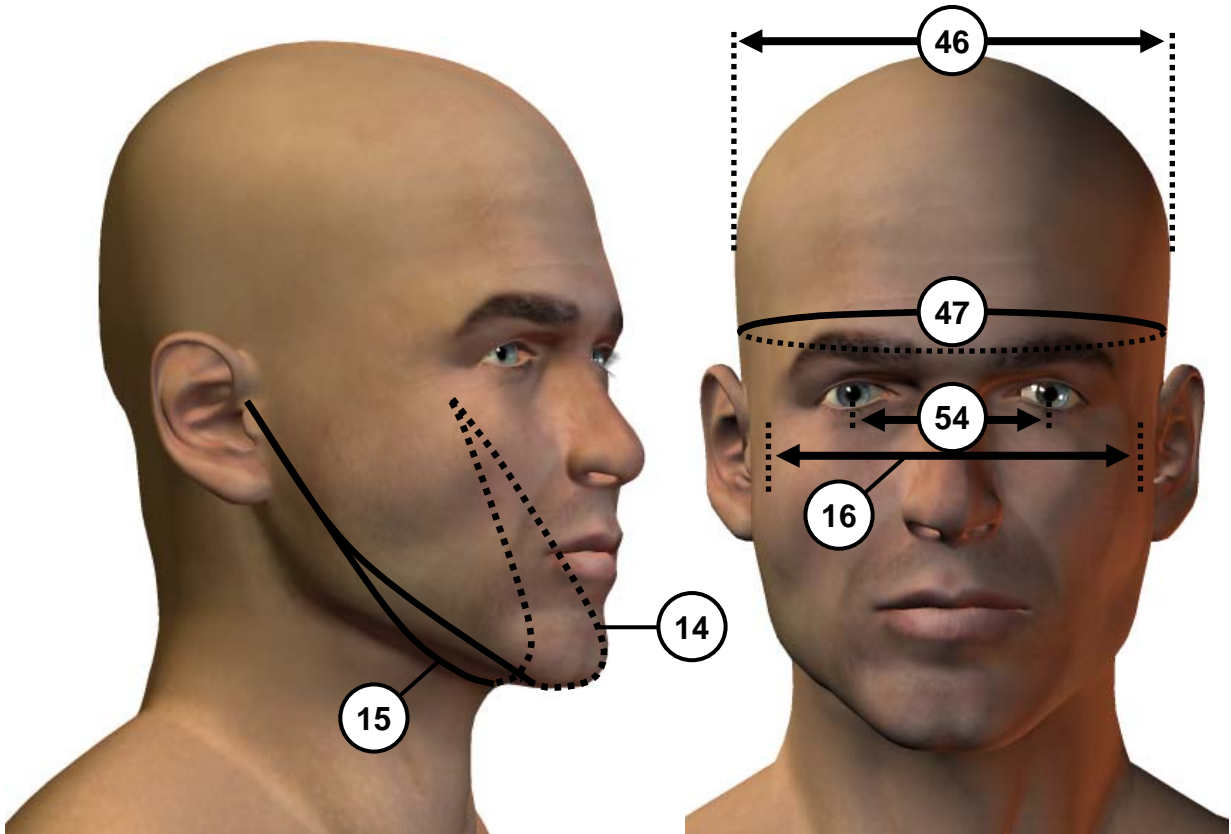
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(45) HAND LENGTH

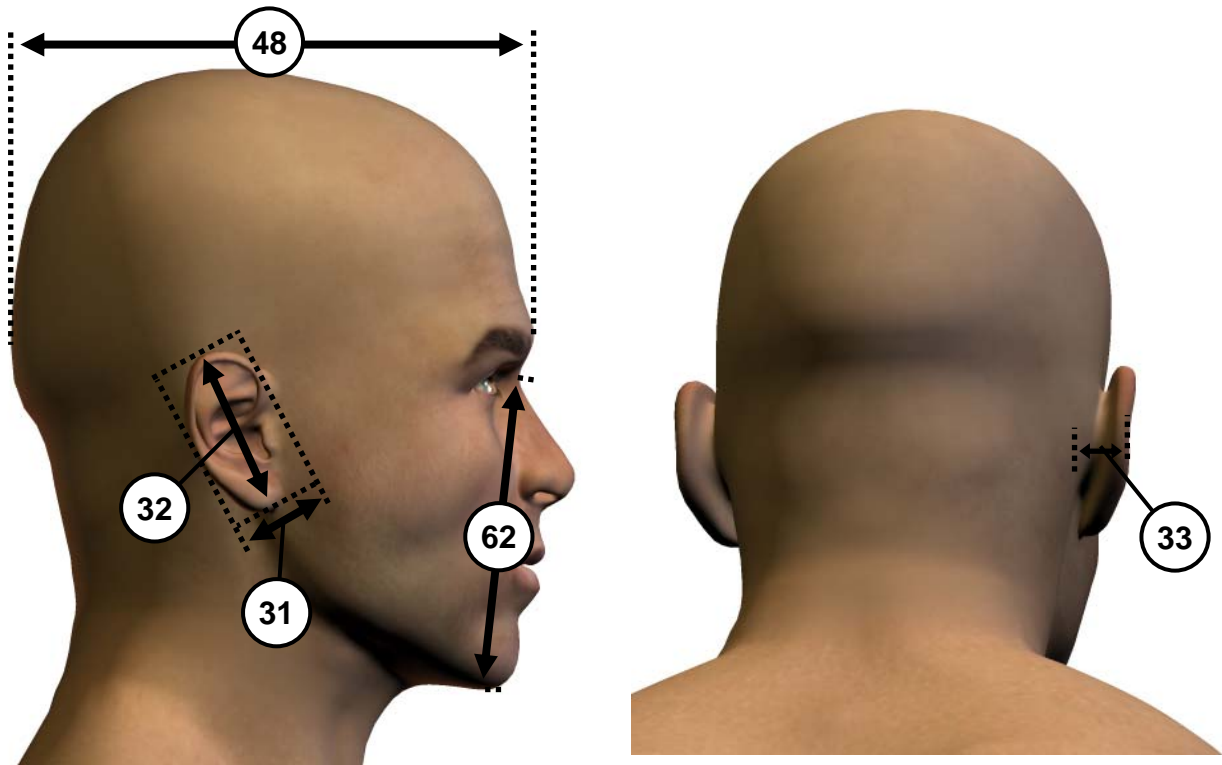
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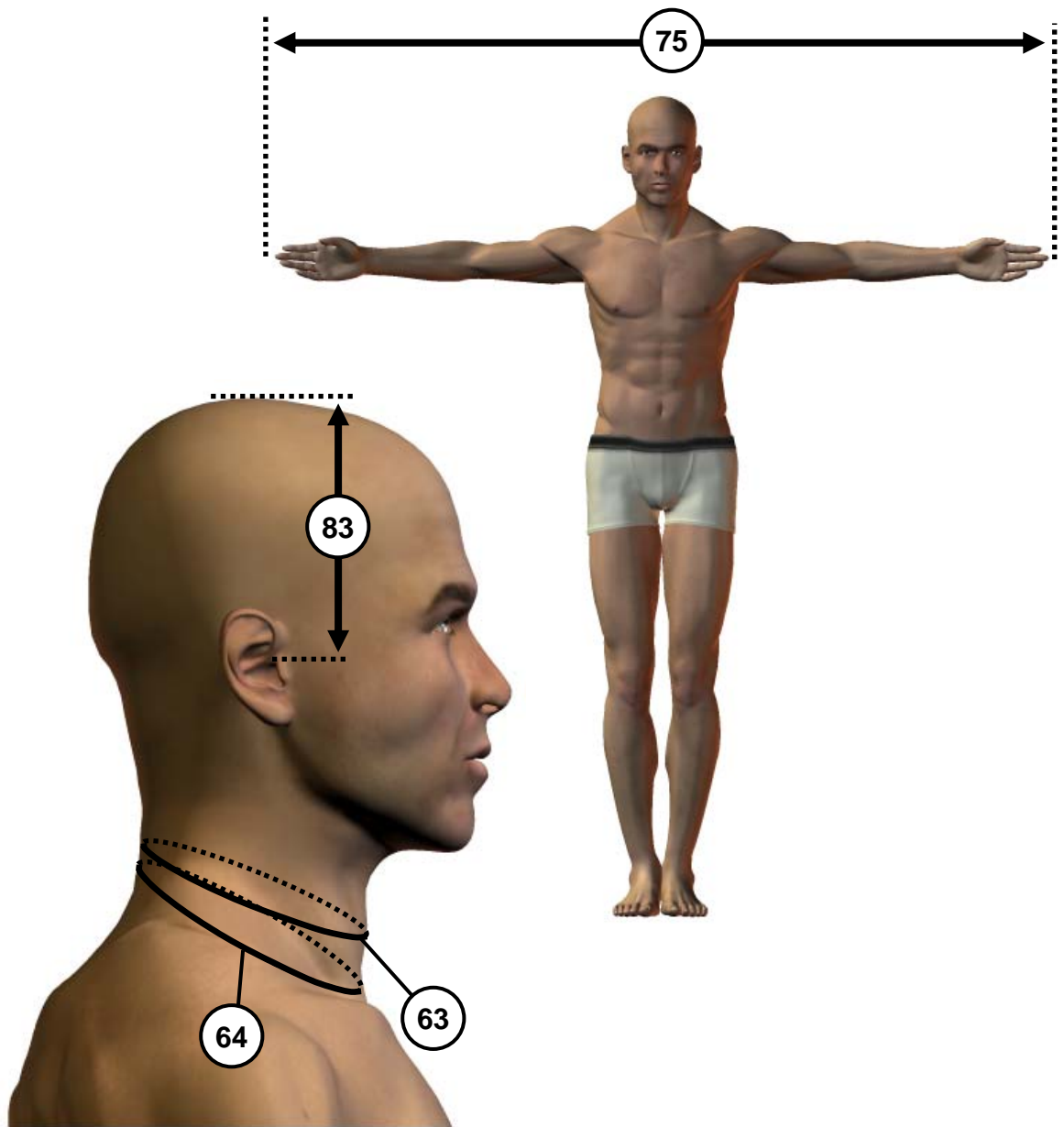
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- (8) BALL OF FOOT LENGTH
- (13) BIMALLEOLAR BREADTH
- (36) FOOT BREADTH, HORIZONTAL
- (37) FOOT LENGTH
- (50) HEEL BREADTH
- (60) LATERAL MALLEOLUS HEIGHT



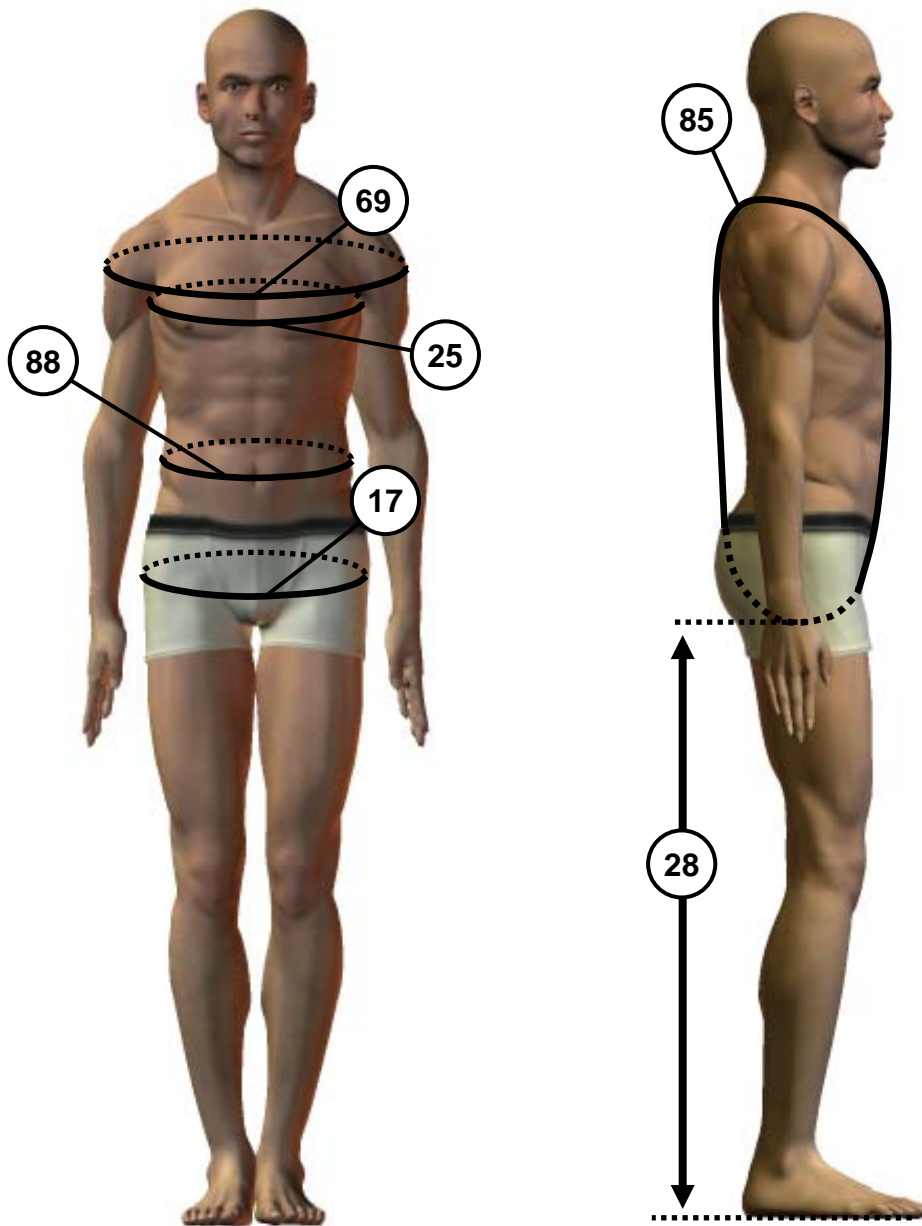
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- (47) HEAD CIRCUMFERENCE
- (54) INTERPUPILLARY BREADTH



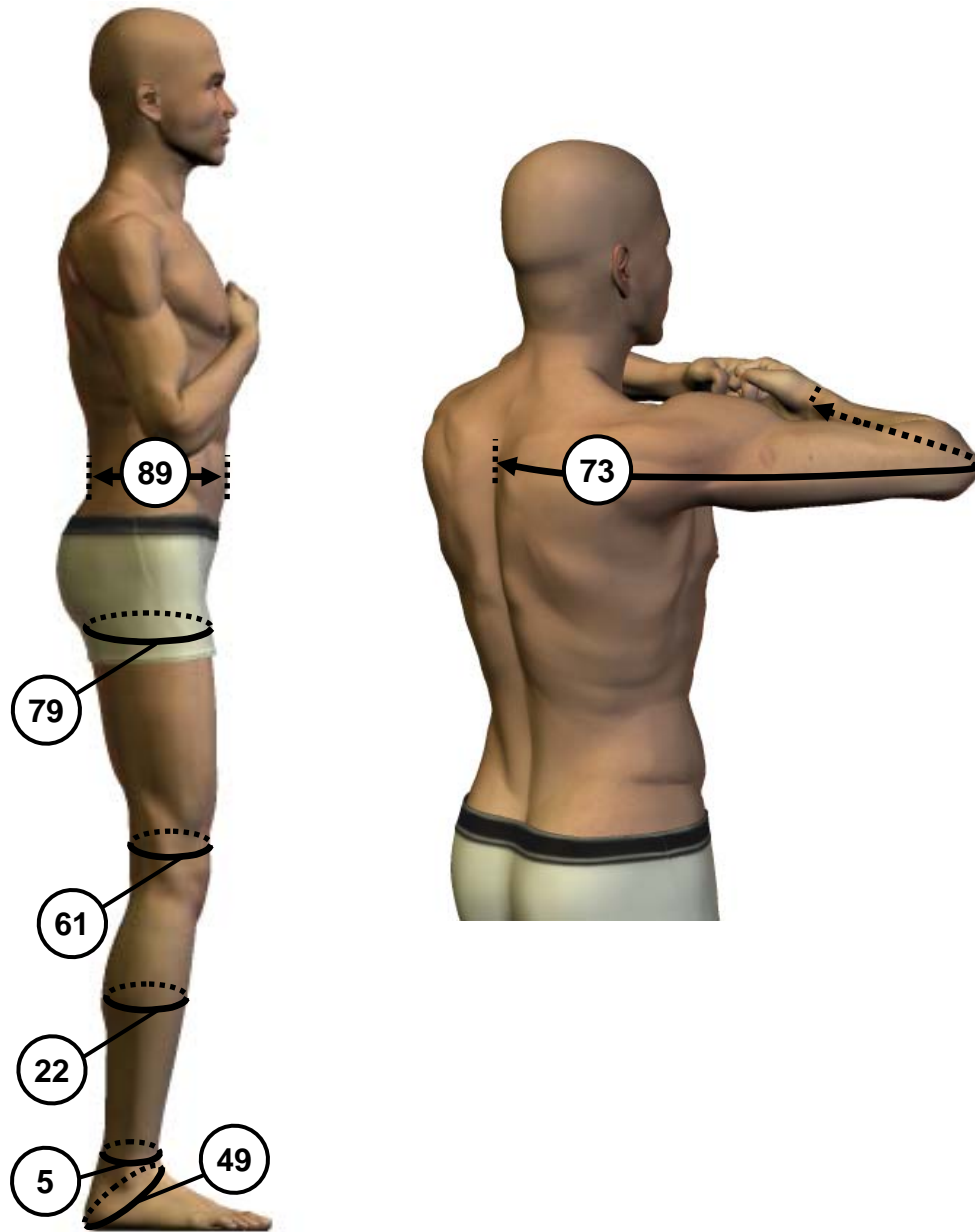
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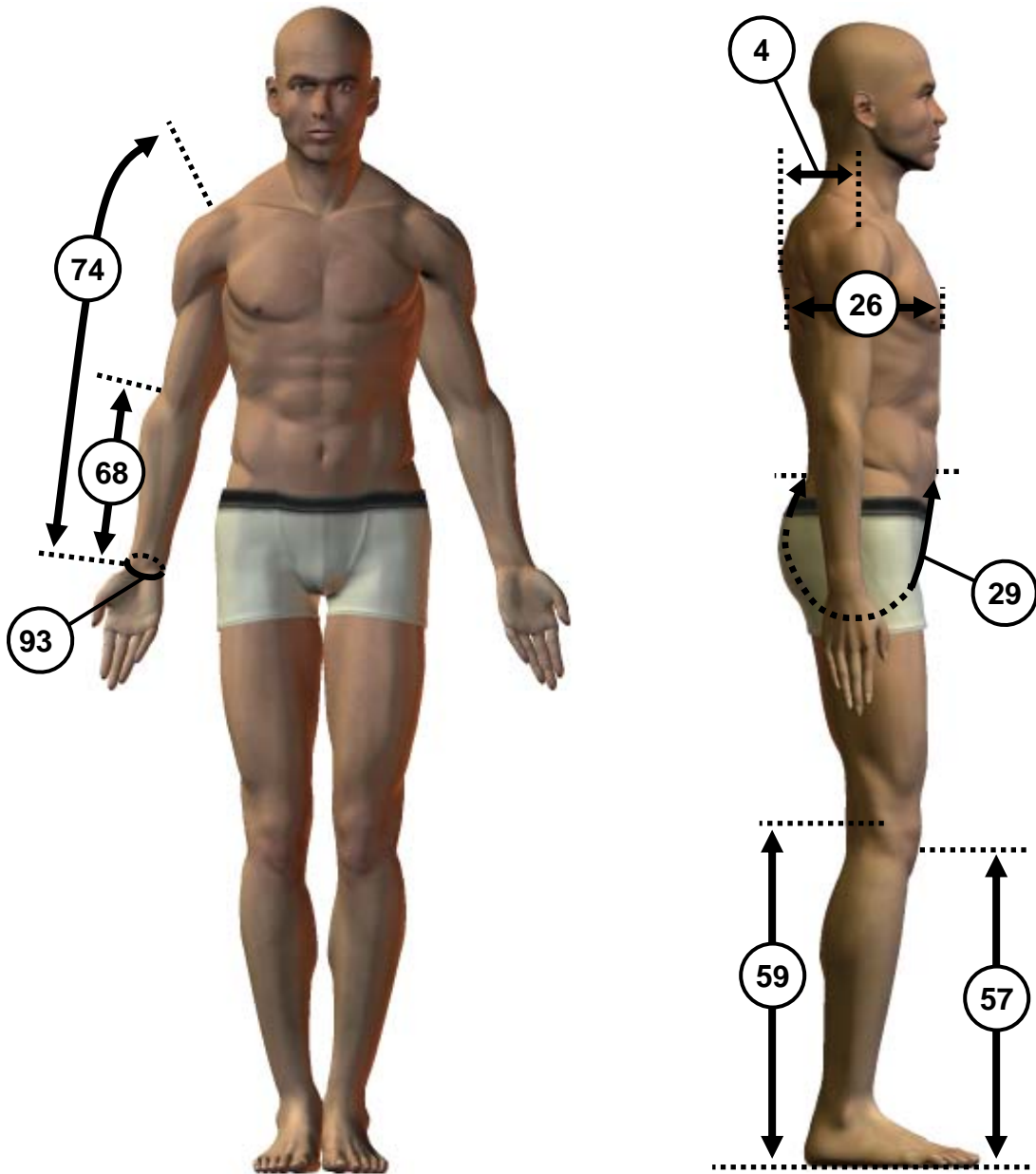
- (63) NECK CIRCUMFERENCE
- (64) NECK CIRCUMFERENCE, BASE
- (75) SPAN
- (83) TRAGION-TOP OF HEAD



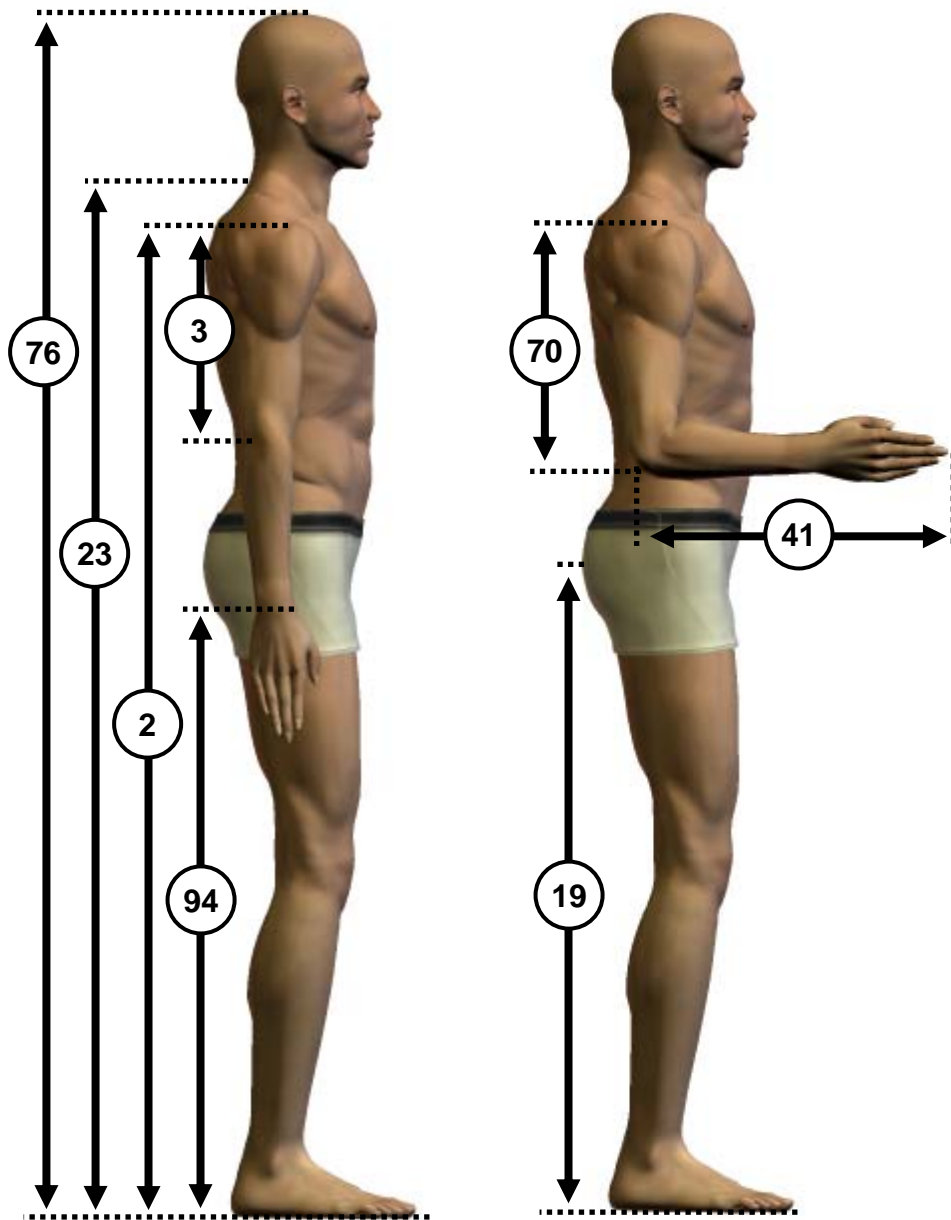
- (17) BUTTOCK CIRCUMFERENCE
- (25) CHEST CIRCUMFERENCE
- (28) CROTCH HEIGHT
- (69) SHOULDER CIRCUMFERENCE
- (85) VERTICAL TRUNK CIRCUMFERENCE (USA)
- (88) WAIST CIRCUMFERENCE (OMPHALION)



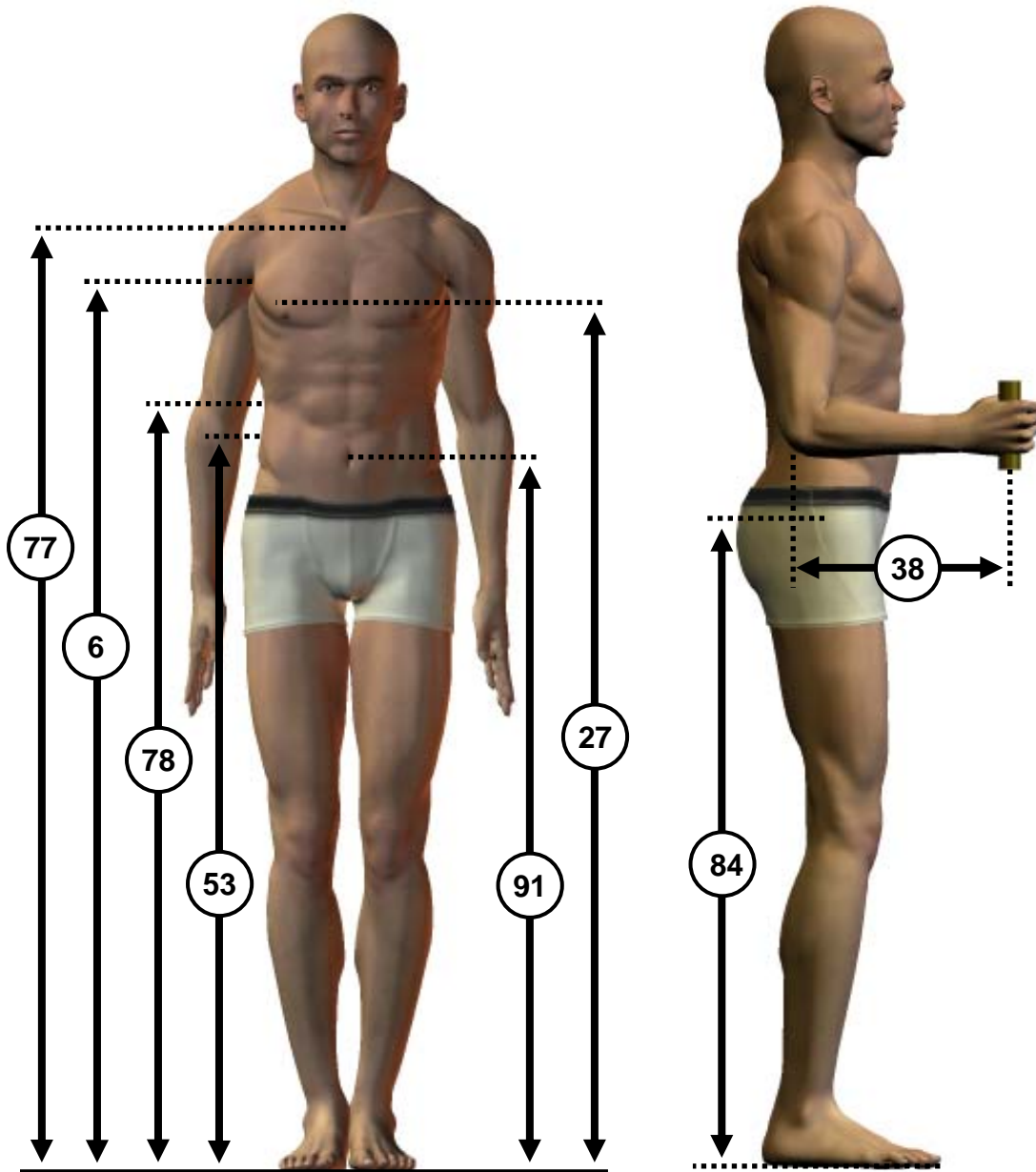
- (5) ANKLE CIRCUMFERENCE
- (22) CALF CIRCUMFERENCE
- (49) HEEL ANKLE CIRCUMFERENCE
- (61) LOWER THIGH CIRCUMFERENCE
- (73) SLEEVE LENGTH: SPINE-WRIST
- (79) THIGH CIRCUMFERENCE
- (89) WAIST DEPTH



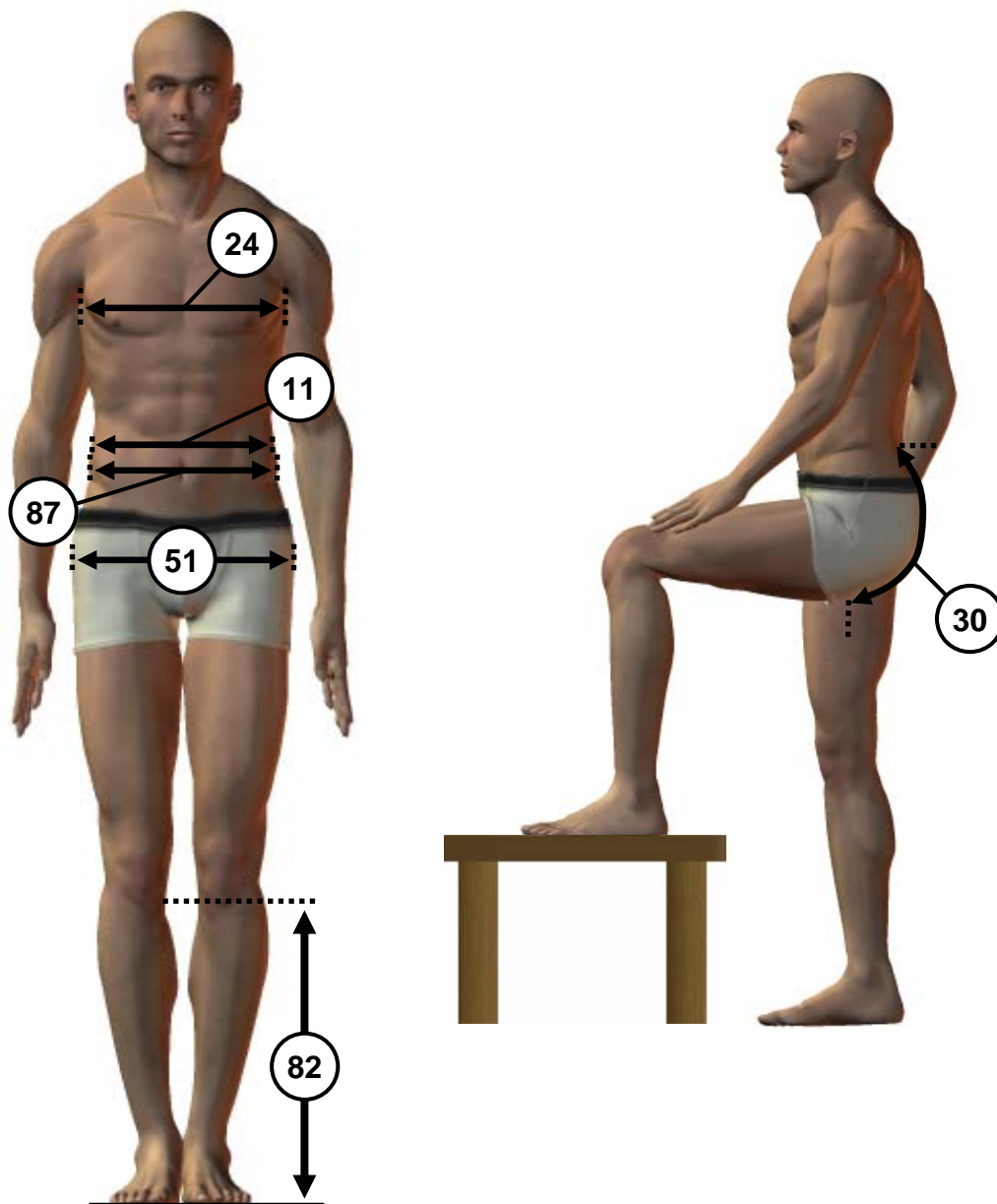
- (4) ACROMION-WALL DEPTH
- (26) CHEST DEPTH
- (29) CROTCH LENGTH (OMPHALION)
- (57) KNEE HEIGHT, MIDPATELLA
- (59) LATERAL FEMORAL EPICONDYLE HEIGHT
- (68) RADIALE-STYLION LENGTH
- (74) SLEEVE OUTSEAM
- (93) WRIST CIRCUMFERENCE



- (2) ACROMIAL HEIGHT
- (3) ACROMION-RADIALE LENGTH
- (19) BUTTOCK HEIGHT
- (23) CERVICALE HEIGHT
- (41) FOREARM-HAND LENGTH
- (70) SHOULDER-ELBOW LENGTH
- (76) STATURE
- (94) WRIST HEIGHT



- (6) AXILLA HEIGHT
- (27) CHEST HEIGHT
- (38) FOREARM-CENTER OF GRIP LENGTH
- (53) ILIOCRISTALE HEIGHT
- (77) SUPRASTERNALE HEIGHT
- (78) TENTH RIB HEIGHT
- (84) TROCHANTERION HEIGHT
- (91) WAIST HEIGHT (OMPHALION)



(11) BICRISTAL BREADTH

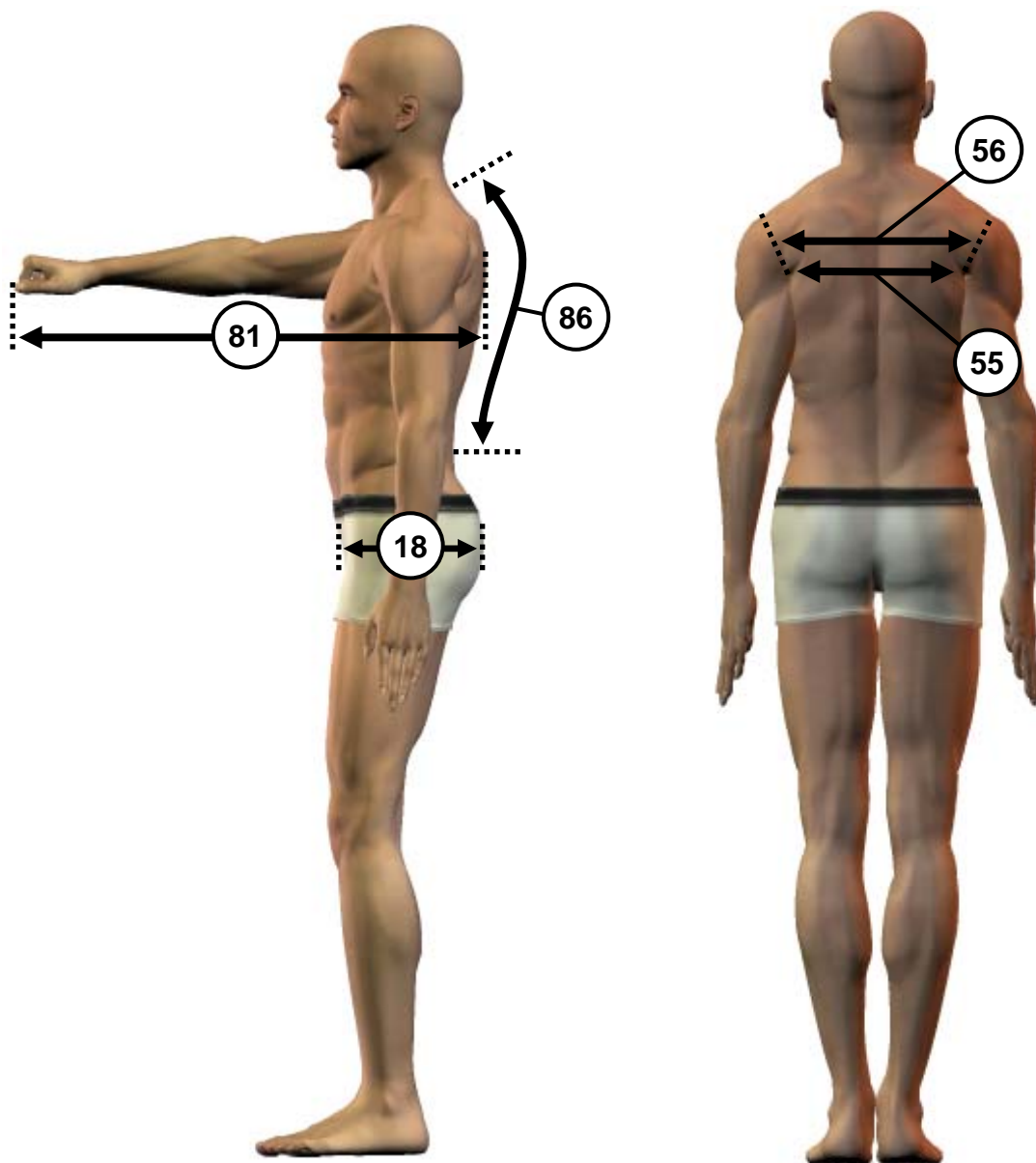
(24) CHEST BREADTH

(30) CROTCH LENGTH, POSTERIOR (OMPHALION)

(51) HIP BREADTH

(82) TIBIAL HEIGHT

(87) WAIST BREADTH



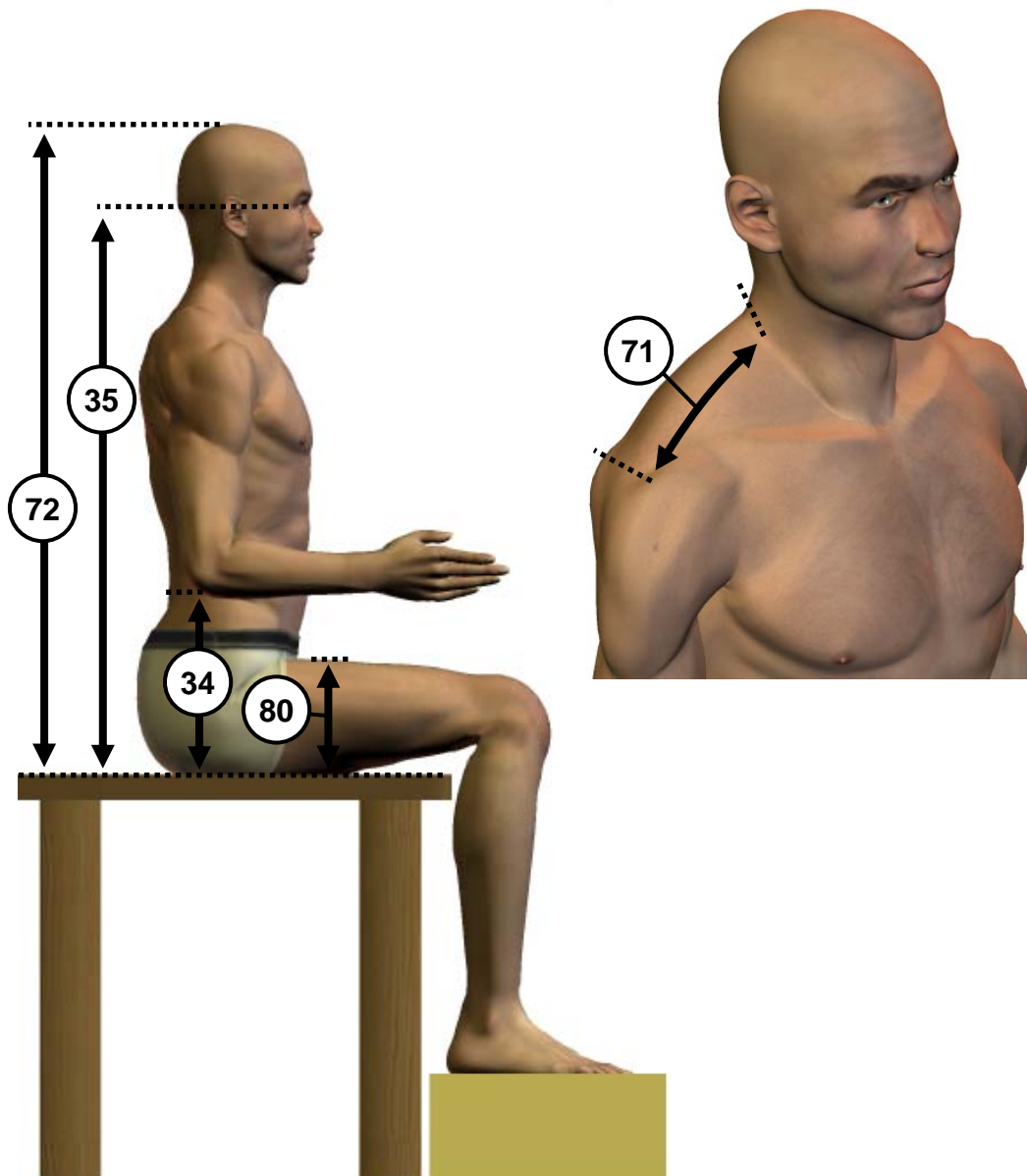
(18) BUTTOCK DEPTH

(55) INTERSCYE I

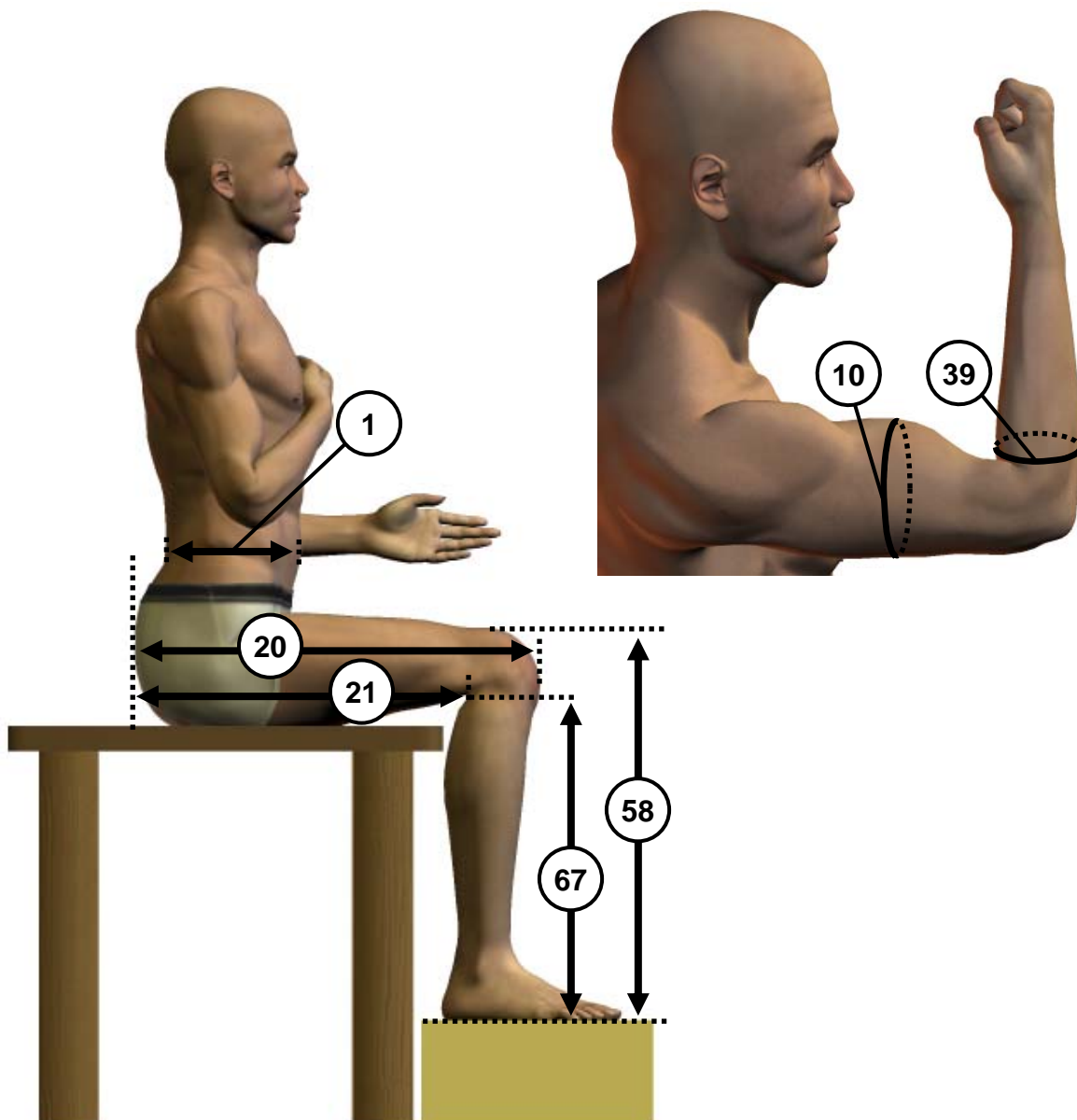
(56) INTERSCYE II

(81) THUMBTIP REACH

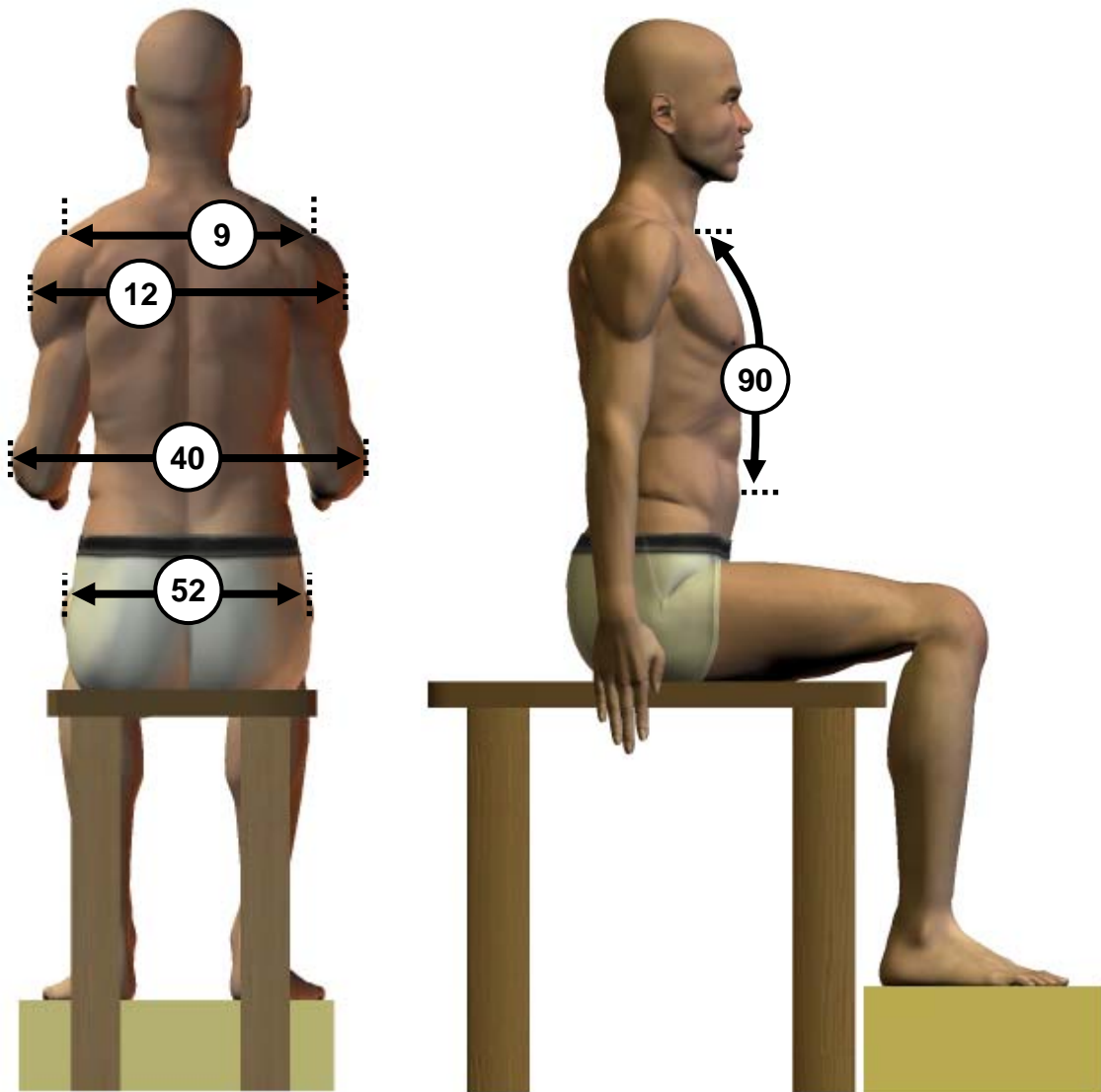
(86) WAIST BACK LENGTH (OMPHALION)



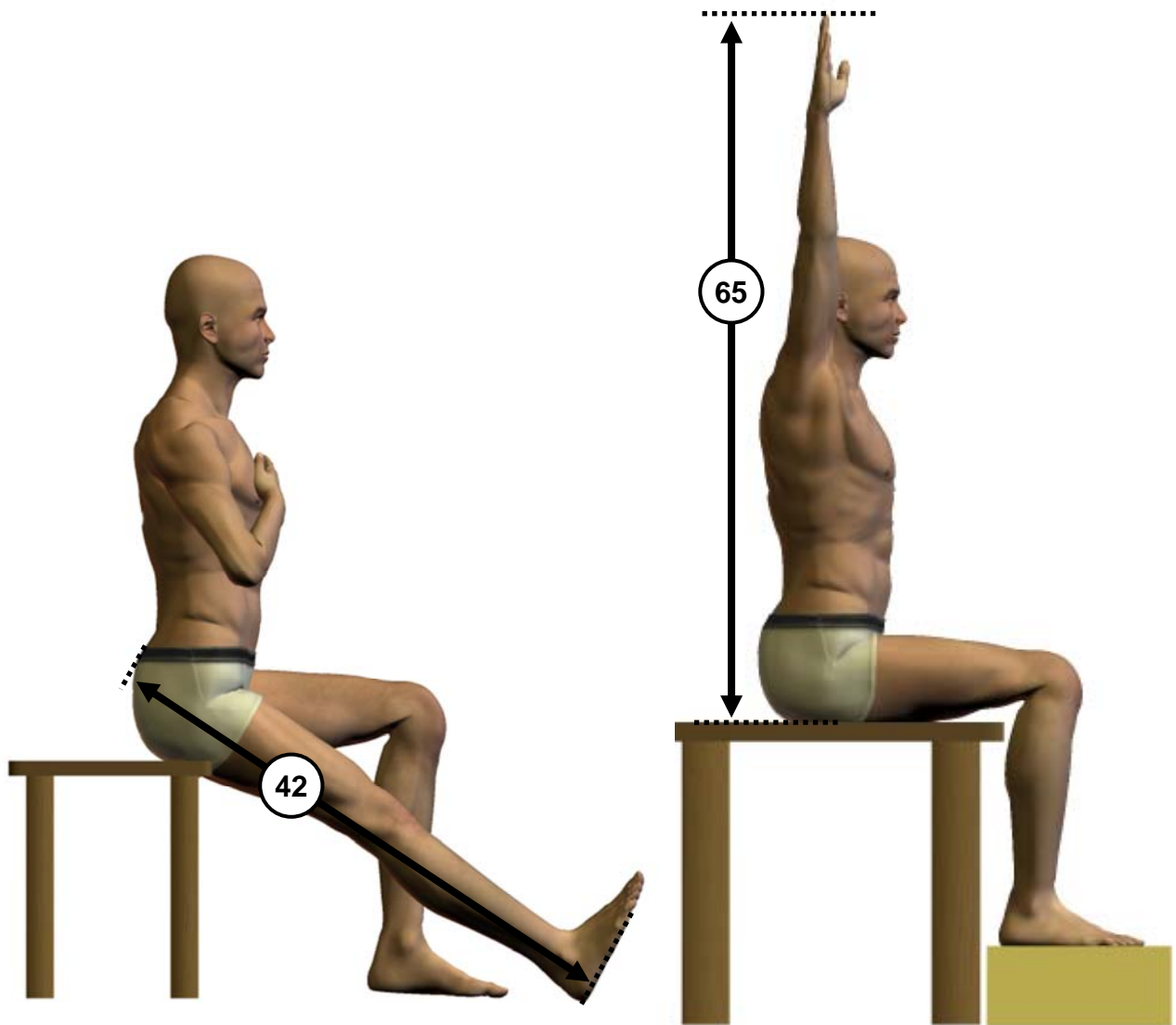
- (34) ELBOW REST HEIGHT
- (35) EYE HEIGHT, SITTING
- (71) SHOULDER LENGTH
- (72) SITTING HEIGHT
- (80) THIGH CLEARANCE



- (1) ABDOMINAL EXTENSION DEPTH, SITTING
- (10) BICEPS CIRCUMFERENCE, FLEXED
- (20) BUTTOCK-KNEE LENGTH
- (21) BUTTOCK-POPLITEAL LENGTH
- (39) FOREARM CIRCUMFERENCE, FLEXED
- (58) KNEE HEIGHT, SITTING
- (67) POPLITEAL HEIGHT



- (9) BIACROMIAL BREADTH
- (12) BIDELOID BREADTH
- (40) FOREARM-FOREARM BREADTH
- (52) HIP BREADTH, SITTING
- (90) WAIST FRONT LENGTH, SITTING

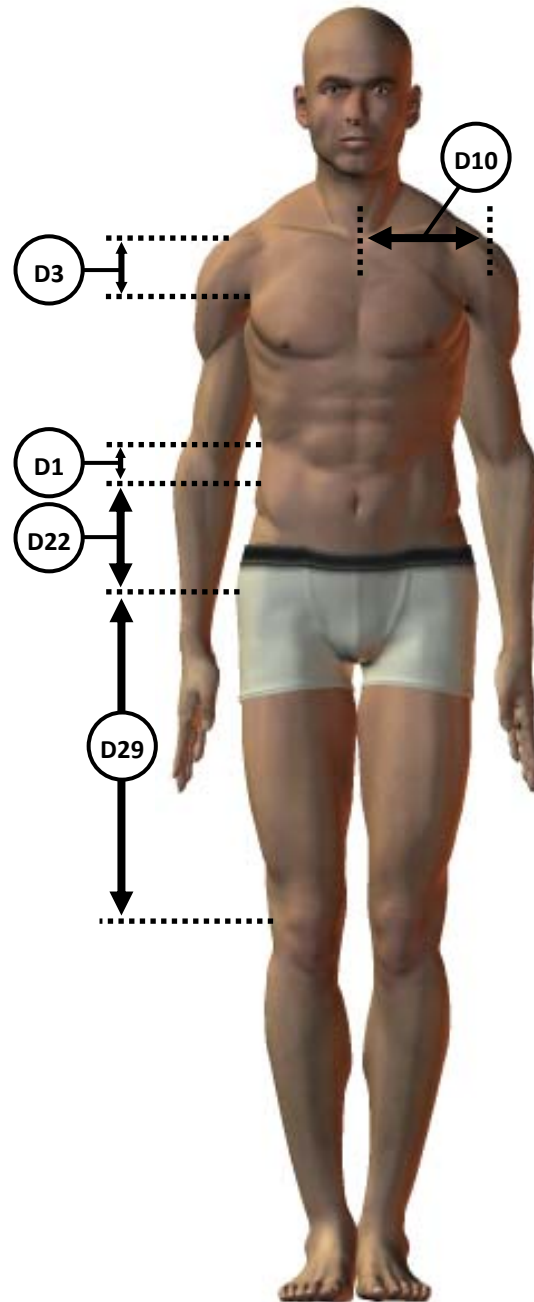


(42) FUNCTIONAL LEG LENGTH

(65) OVERHEAD FINGERTIP REACH, SITTING

APPENDIX D

VISUAL INDEX OF DERIVED DIMENSIONS



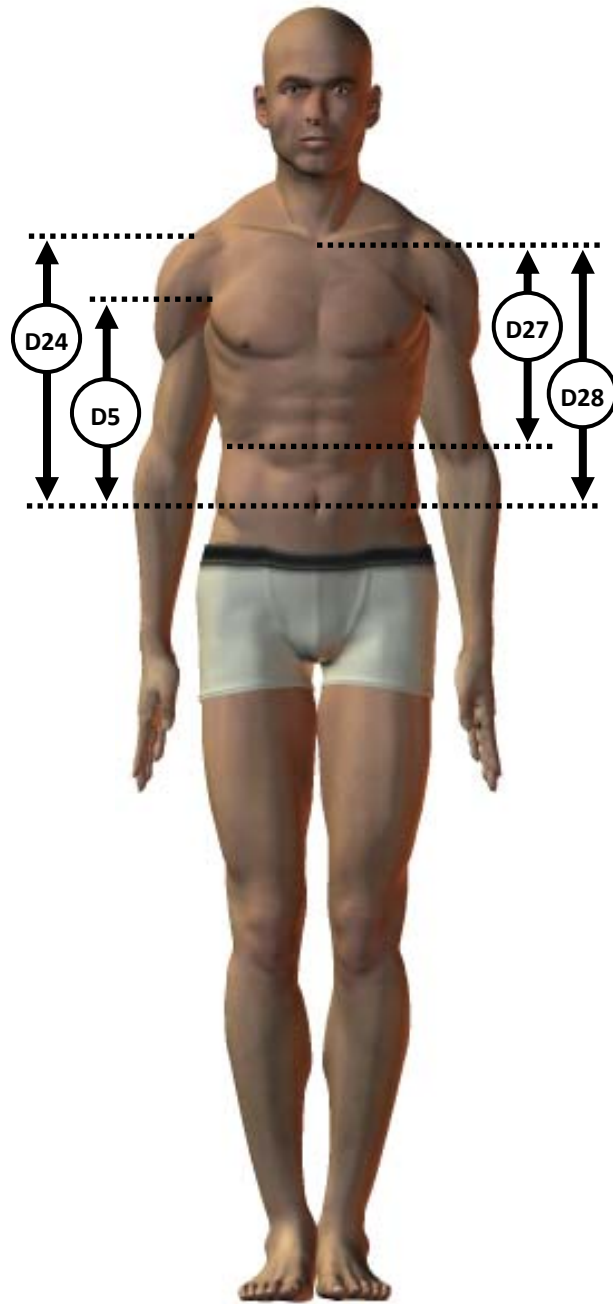
(D1) ABDOMINAL LINK

(D3) ACROMION-AXILLA LENGTH

(D10) CLAVICLE LINK

(D22) PELVIC LINK

(D29) THIGH LINK

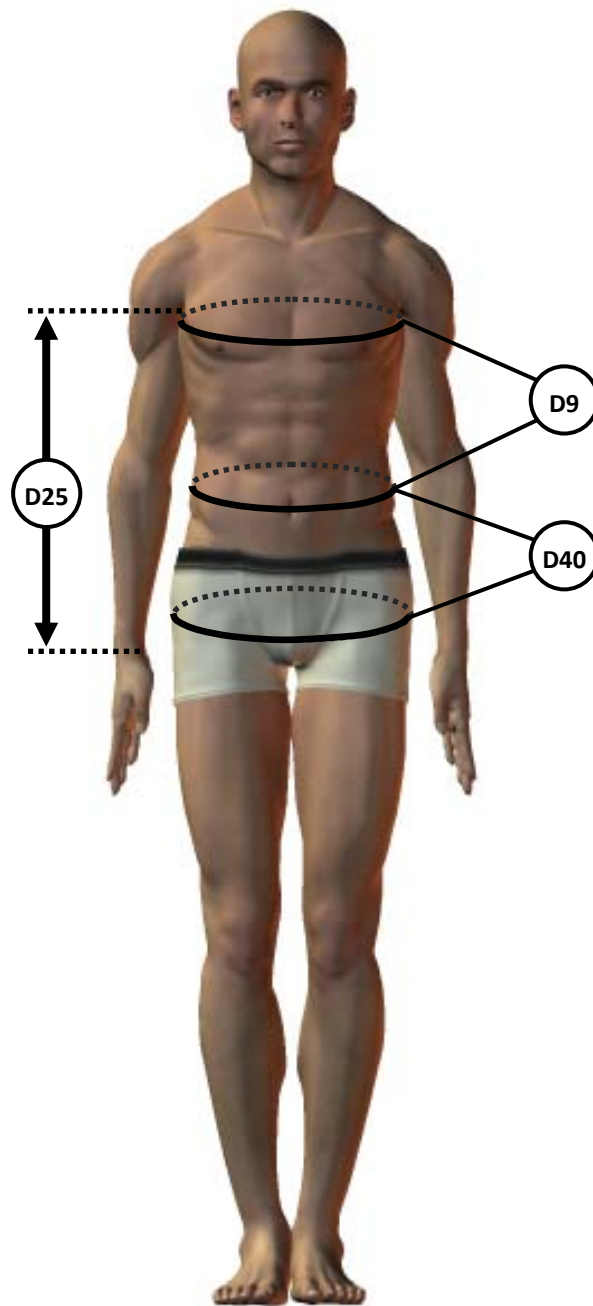


(D5) AXILLA-WAIST LENGTH (OMPHALION)

(D24) SHOULDER-WAIST LENGTH (OMPHALION)

(D27) SUPRASTERNALE-TENTH RIB LENGTH

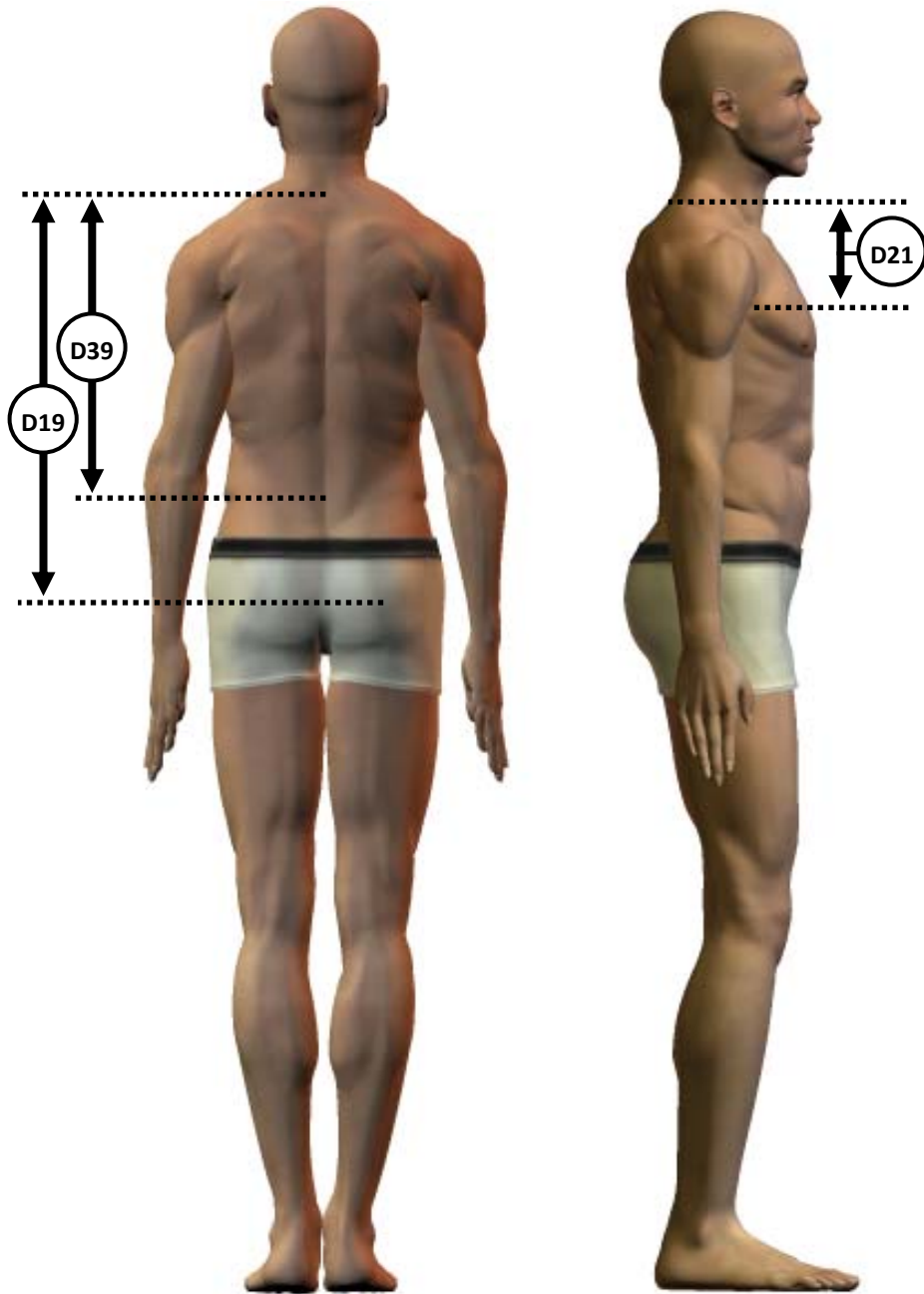
(D28) SUPRASTERNALE-WAIST LENGTH (OMPHALION)



(D9) CHEST-WAIST DROP (OMPHALION)

(D25) SLEEVE INSEAM

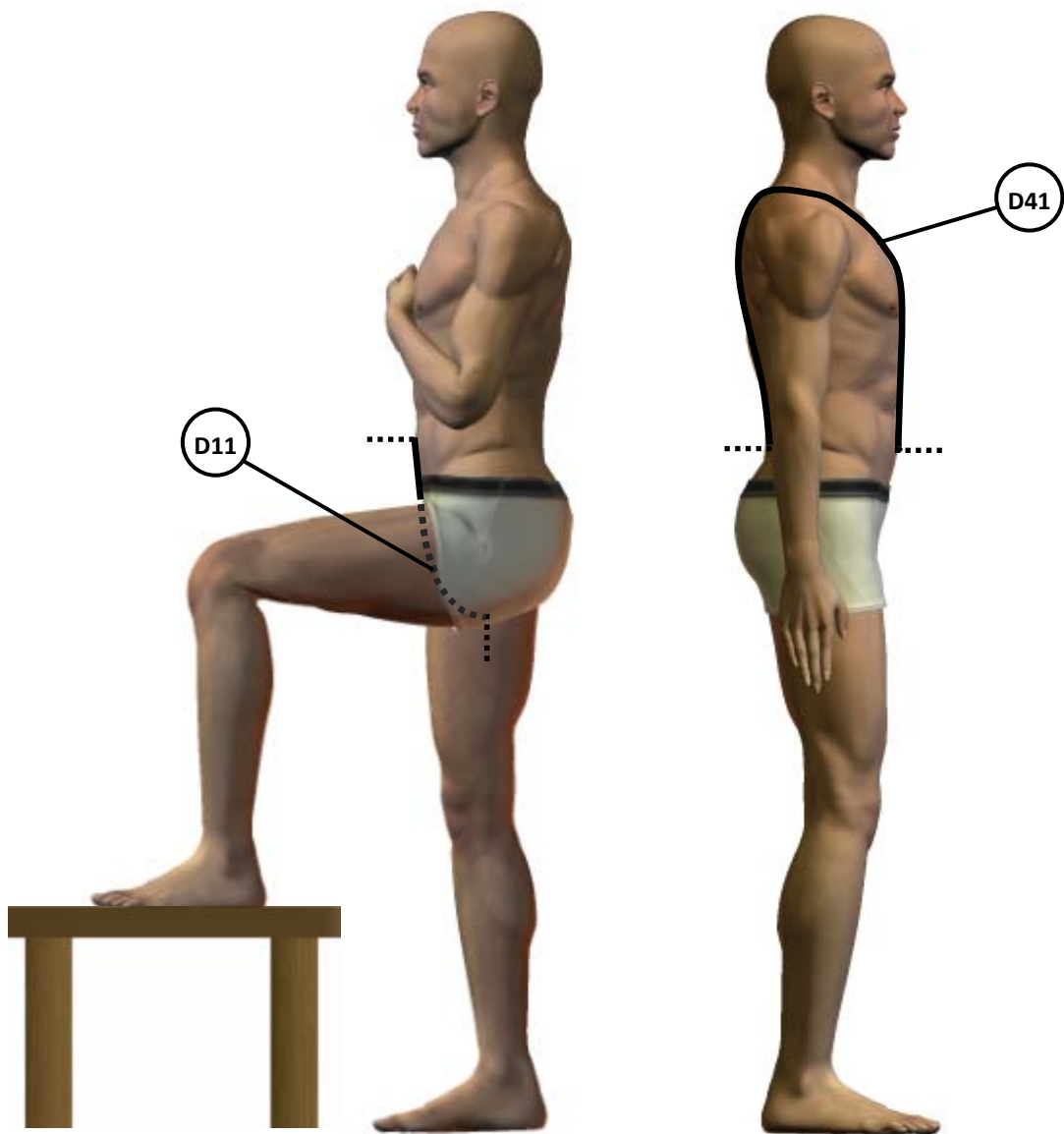
(D40) WAIST-BUTTOCK DROP (OMPHALION)



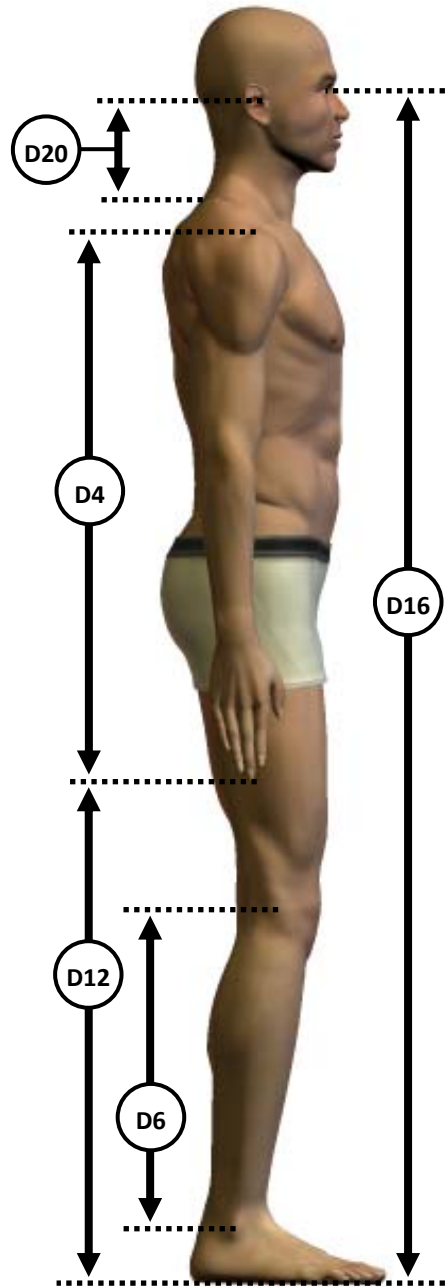
(D19) NECK-BUTTOCK LENGTH

(D21) NECK-SCYE LENGTH

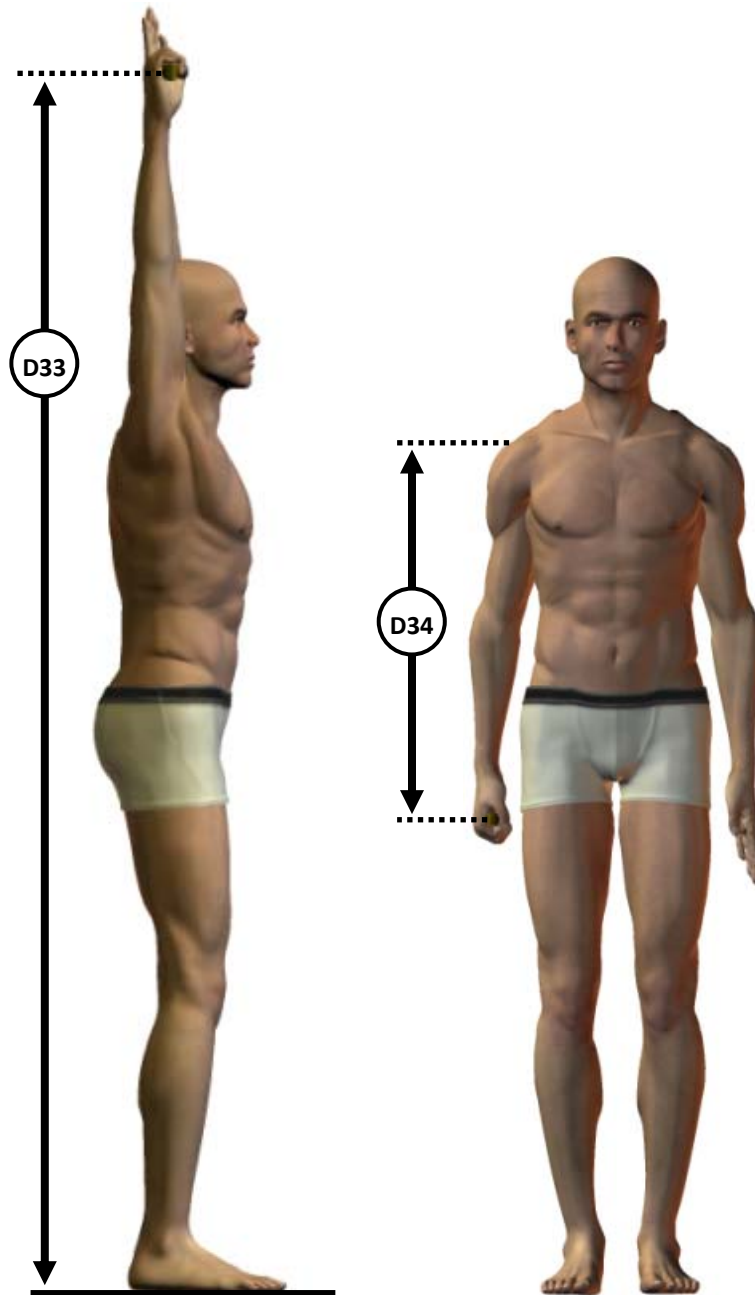
(D39) WAIST BACK, VERTICAL (OMPHALION)



(D11) CROTCH LENGTH, ANTERIOR (OMPHALION)
(D41) WAIST-WAIST (OMPHALION) OVER SHOULDER

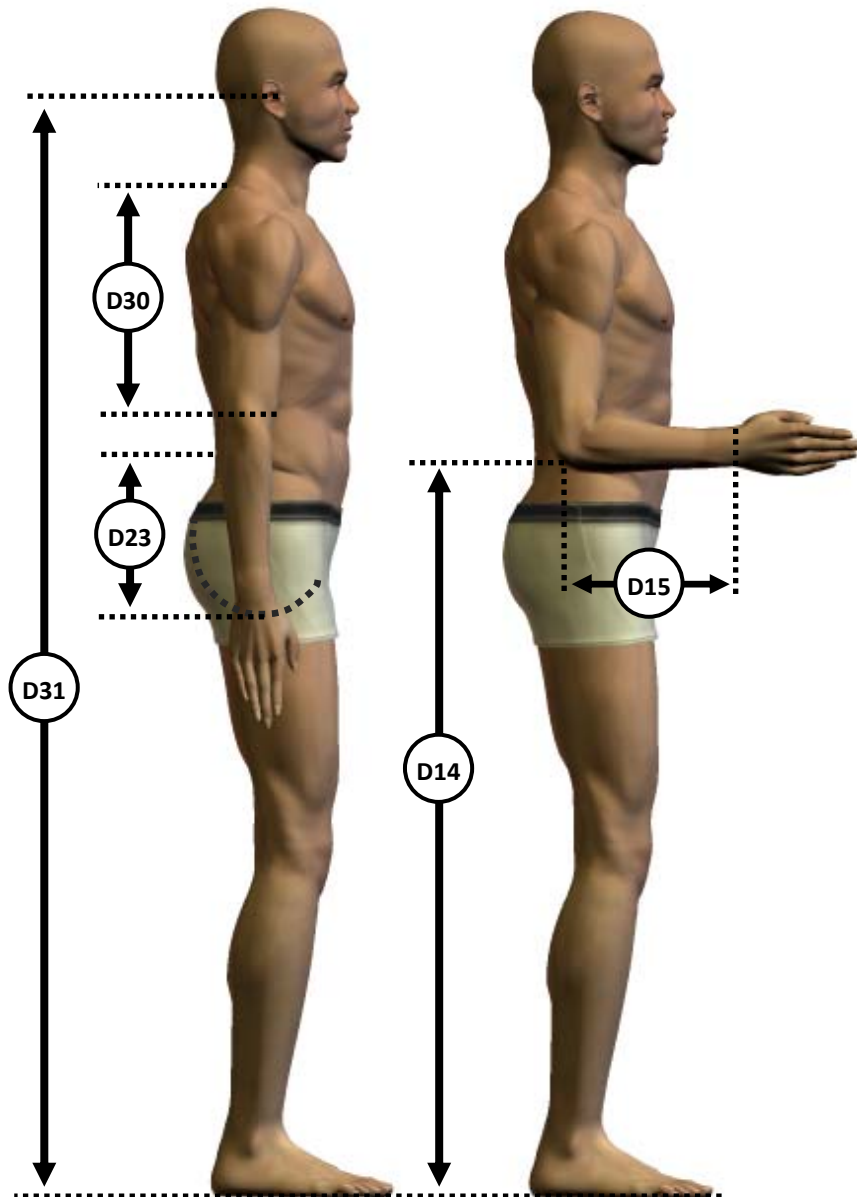


- (D4) ARM LENGTH
- (D6) CALF LINK
- (D12) DACTYLION HEIGHT
- (D16) EYE HEIGHT
- (D20) NECK LINK

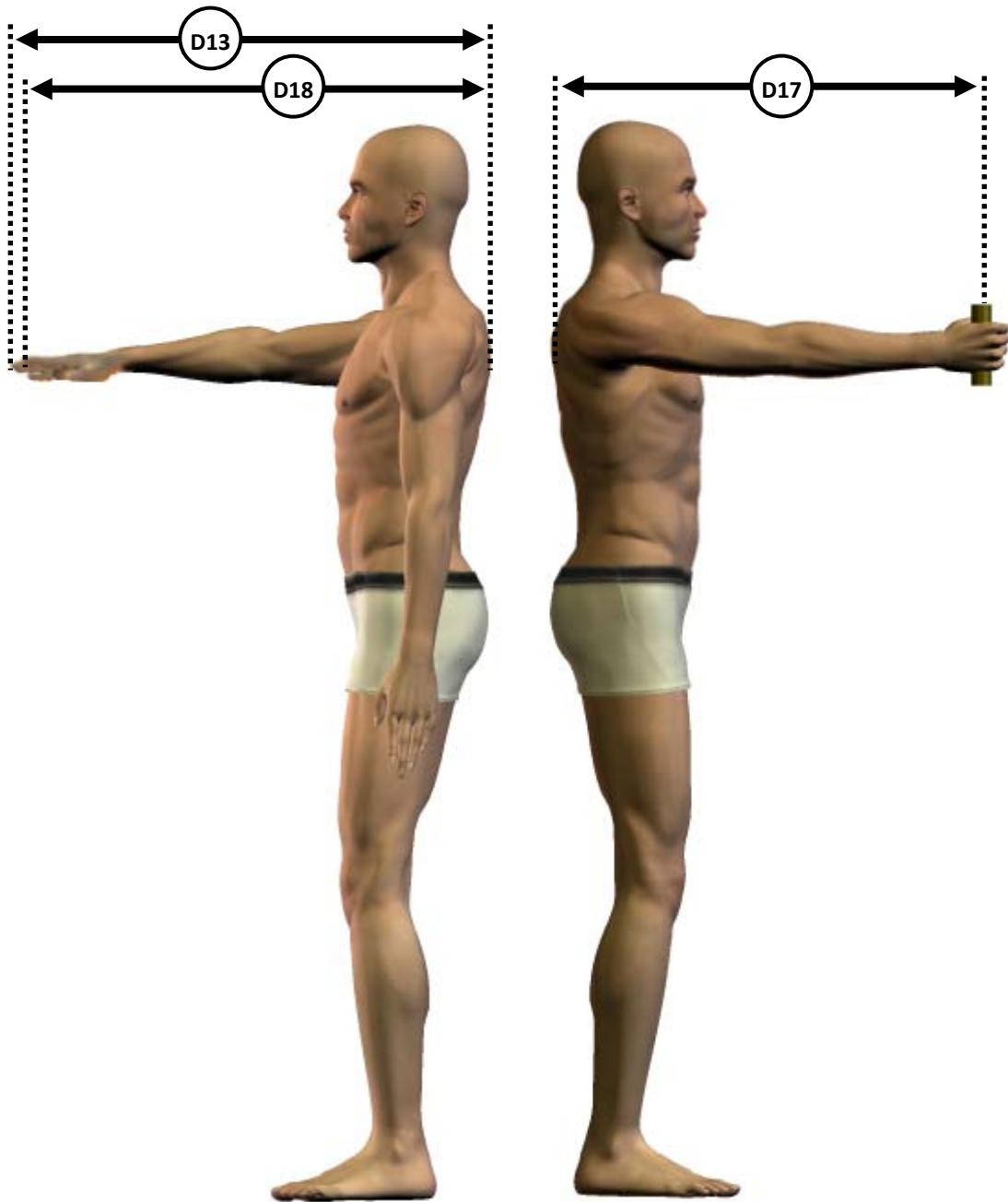


(D33) VERTICAL GRIP REACH

(D34) VERTICAL GRIP REACH DOWN



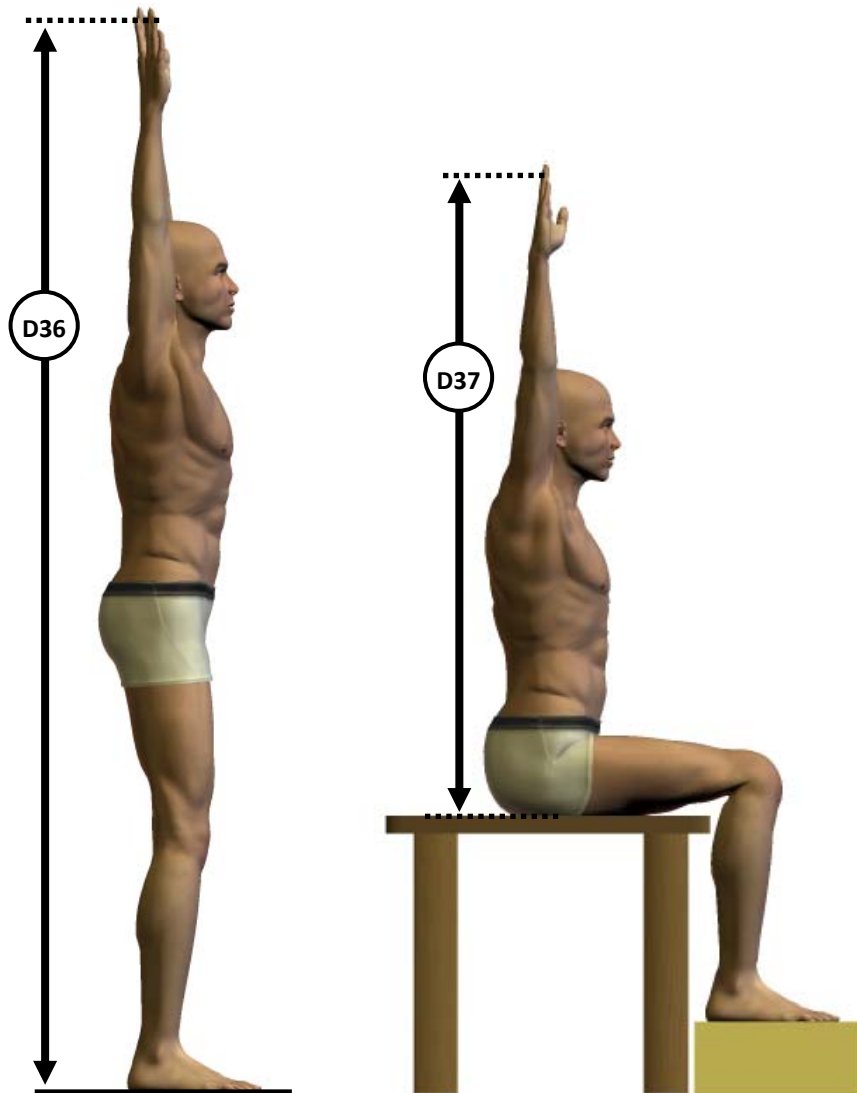
- (D14) ELBOW REST HEIGHT, STANDING
- (D15) ELBOW-WRIST LENGTH
- (D23) RISE (OMPHALION)
- (D30) THORAX LINK
- (D31) TRAGION HEIGHT



(D13) DACTYLION REACH FROM WALL

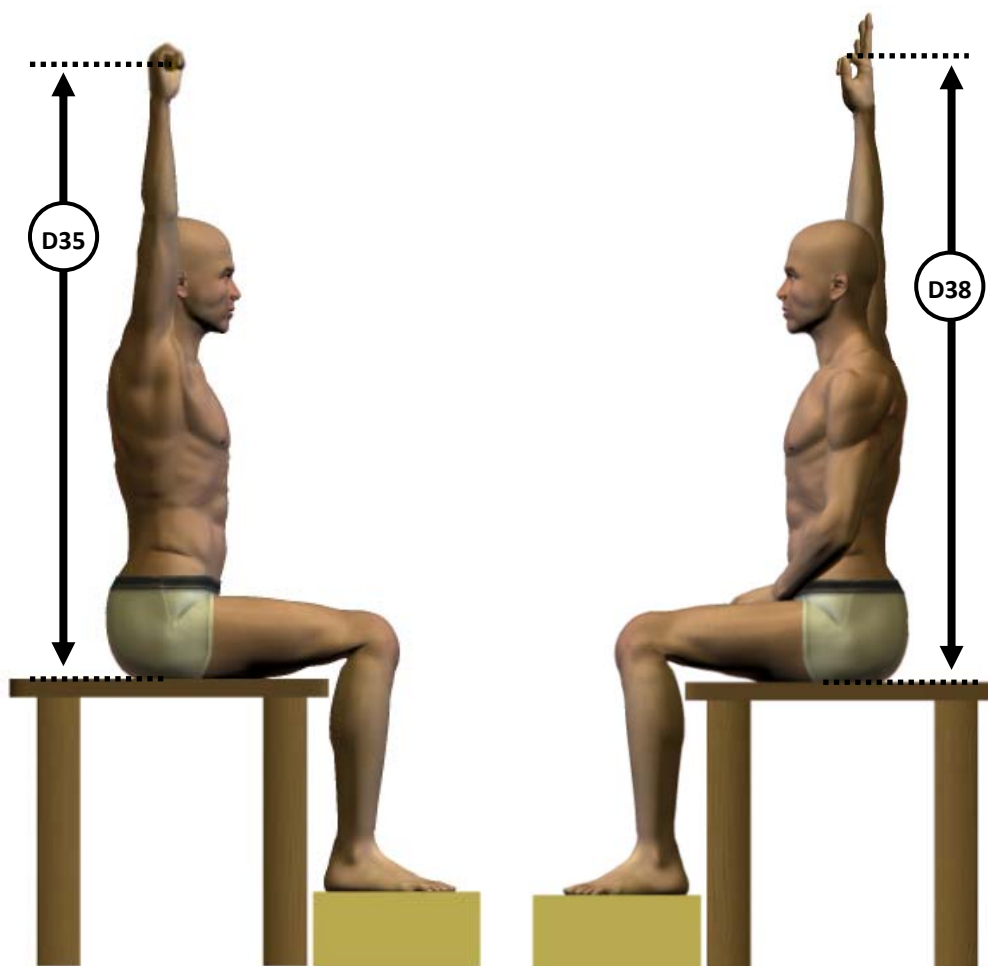
(D17) FUNCTIONAL GRIP REACH

(D18) INDEX FINGER REACH



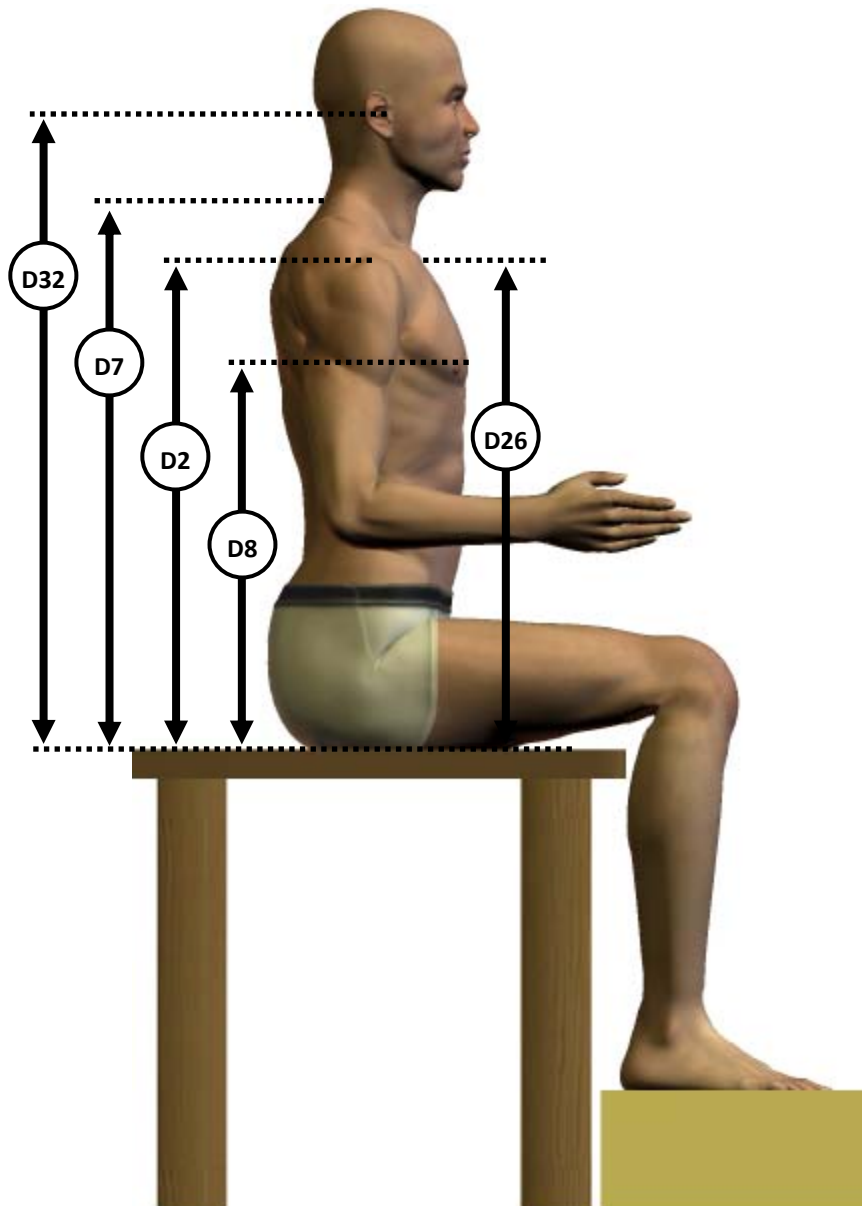
(D36) VERTICAL INDEX FINGERTIP REACH

(D37) VERTICAL INDEX FINGERTIP REACH, SITTING



(D35) VERTICAL GRIP REACH, SITTING

(D38) VERTICAL THUMB TIP REACH, SITTING



(D2) ACROMIAL HEIGHT, SITTING

(D7) CERVICALE HEIGHT, SITTING

(D8) CHEST HEIGHT, SITTING

(D26) SUPRASTERNALE HEIGHT, SITTING

(D32) TRAGION HEIGHT, SITTING

APPENDIX E

THE STATISTICAL MEASURES

The statistical measures used in this report to summarize the survey data are univariate statistics selected to provide potential users with a maximum of useful information. They are also the statistics used in other anthropometric reports prepared by the U.S. Marine Corps as well as other military services.

The statistics provided for each variable are the following:

1. The arithmetic mean (\bar{x}). This is the arithmetic average and is computed as the sum of the values divided by the number of values:

$$\bar{x} = \frac{\sum X}{N}$$

where X is the individual measurement and N is the sample size.

2. The standard error of the mean (Se). This is a standard deviation type of statistic and is an estimate of the sampling error of the mean. It is computed as:

$$Se_x = \frac{SD}{\sqrt{N}}$$

where SD is the standard deviation for that variable and N is the sample size.

3. The standard deviation (SD). This is a measure of variability and is computed as:

$$SD = \sqrt{\frac{\sum (X - \bar{x})^2}{N}}$$

where X is the individual measurement, \bar{x} is the mean value for that measurement, and N is the sample size.

4. The standard error of the SD (Se_{SD}). This is another measure of variability and is an estimate of the sampling error of the SD. It is computed as:

$$Se_{SD} = \frac{SD}{\sqrt{2N}}$$

where SD is the standard deviation of the variable of interest and N is the sample size.

5. Minimum. The smallest observed value for a particular variable.
6. Maximum. The largest observed value for a particular variable.
7. N. The number of subjects measured for a particular variable.
8. Skewness (β_1). A dimensionless statistic that is an indicator of whether a set of data is symmetrically distributed. It is computed as:

$$\beta_1 = \frac{\sum (X - \bar{x})^3}{N \times SD^3}$$

where X is the individual measurement, \bar{x} is the mean of that measurement, N is the sample size, and SD is the standard deviation of the measurement. In a normal distribution the value of β_1 is 0.

Kurtosis (β_2). A dimensionless statistic that indicates the level of agreement between a normal distribution and the actual distribution of the data. In a normal distribution the value for β_2 is 3. It should be noted that some commercially available statistical packages automatically center kurtosis around 0.

9. The coefficient of variation. A statistic that restates the standard deviation as a percent of the mean and is computed as:

$$CV = 100 \times \frac{SD}{\bar{x}}$$

where \bar{x} is the mean and SD is the standard deviation of a measurement.

10. The frequency tables. These tables group the data for a variable into a series of intervals. The intervals used in this output are 1 mm, 2 mm, 2.5 mm, 5 mm, 10 mm, 15 mm, and 20 mm. The tables list, for each interval, the start and end point of the interval, the number of participants that fall within the interval (frequency or F); the cumulative frequency (CumF); and the values of F and CumF expressed as a percentage of the total number of measurements for that variable (FPct and CumFPct).
11. The percentiles. This group of statistics represents measures of order or position. These measures can be thought of as being obtained by arranging

the data in order from the smallest to the largest and then observing the value of the datum which lies at a specified position in the array. The 99 percentiles—ranging from the first to the 99th—are the values at the points which separate consecutive blocks or units of 1% of the data in the ordered array. The first percentile is the value that separates the smallest 1% of the data from the 99% of the data with larger values; the second percentile separates the smallest 2% from the larger 98% and so on. Twenty-five of these percentiles which are believed to be the most useful to designers and engineers have been included for each measurement. When distributions are normally distributed, percentiles can be estimated from the mean and standard deviation. However, these estimates are just that – estimates. Exact percentiles calculated from the data are generally preferable, and that is the approach that has been taken here.

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APPENDIX F

DIMENSION-NUMBER CROSS-REFERENCE TABLE

Many users of the MC-ANSUR database will be familiar with the ANSUR database from 1988-1989. To assist users familiar with ANSUR dimension numbers, a cross-reference table for the new and old dimension numbers has been provided (Table F-1). The table includes all of the measured and derived dimensions in ANSUR and MC-ANSUR. A blank in the column means that that dimension was not measured in that survey. If a dimension retained the same name but was changed in such a way that it is no longer comparable, then that dimension is listed twice (e.g. Functional Leg Length).

TABLE F-1

Cross Reference of Dimension Numbers from MC-ANSUR and ANSUR

MC-ANSUR Number	Dimension Name	ANSUR Number
1	Abdominal Extension Depth, Sitting	1
D1	Abdominal Link	D1
2	Acromial Height	2
D2	Acromial Height, Sitting	3
D3	Acromion-Axilla Length	D2
3	Acromion-Radiale Length	4
4	Acromion-Wall Depth	
5	Ankle Circumference	5
D4	Arm Length	D3
6	Axilla Height	6
	Axilla-Waist Length (Natural Indentation)	D4
D5	Axilla-Waist Length (Omphalion)	D5
	Axillary Arm Circumference	7
7	Ball of Foot Circumference	8
8	Ball of Foot Length	9
9	Biacromial Breadth	10
10	Biceps Circumference, Flexed	11
11	Bicristal Breadth	
12	Bideltoid Breadth	12
13	Bimalleolar Breadth	13
	Bispinous Breadth	14
14	Bitragion Chin Arc	15
	Bitragion Coronal Arc	16
	Bitragion Crinion Arc	17

TABLE F-1 Continued

MC-ANSUR Number	Dimension Name	ANSUR Number
	Bitracion Frontal Arc	18
15	Bitracion Submandibular Arc	19
	Bitracion Subnasale Arc	20
16	Bizygomatic Breadth	21
	Bustpoint/Thelion-Bustpoint/Thelion Breadth	22
17	Buttock Circumference	23
18	Buttock Depth	24
19	Buttock Height	25
20	Buttock-Knee Length	26
21	Buttock-Popiteal Length	27
22	Calf Circumference	28
	Calf Height	29
D6	Calf Link	D6
23	Cervicale Height	
	Cervicale Height	30
D7	Cervicale Height, Sitting	
	Cervicale Height, Sitting	31
24	Chest Breadth	
	Chest Breadth	32
25	Chest Circumference - Males	
25	Chest Circumference - Females	33
	Chest Circumference at Scye	34
	Chest Circumference below Breast	35
26	Chest Depth - Males	
	Chest Depth - Males	36
26	Chest Depth - Females	36
27	Chest Height - Males	
	Chest Height - Males	37
27	Chest Height - Females	37
D8	Chest Height, Sitting - Males	
D8	Chest Height, Sitting - Females v	D7
	Chest-Waist Drop (Natural Indentation)	D8
D9	Chest-Waist Drop (Omphalion) - Males	
D9	Chest-Waist Drop (Omphalion) - Females	D9
D10	Clavicle Link	D10
28	Crotch Height	38
	Crotch Length (Natural Indentation)	39
29	Crotch Length (Omphalion)	40

TABLE F-1 Continued

MC-ANSUR Number	Dimension Name	ANSUR Number
	Crotch Length, Anterior (Natural Indentation)	D11
D11	Crotch Length, Anterior (Omphalion)	D12
	Crotch Length, Posterior (Natural Indentation)	41
30	Crotch Length, Posterior (Omphalion)	42
D12	Dactylion Height	D13
D13	Dactylion Reach From Wall	D14
	Dactylion Reach From Wall, Extended	D15
31	Ear Breadth	43
32	Ear Length	44
	Ear Length above Tragion	45
33	Ear Protrusion	46
	Elbow Circumference	47
34	Elbow Rest Height	48
D14	Elbow Rest Height, Standing	D16
D15	Elbow-Wrist Length	D18
D16	Eye Height	D19
35	Eye Height, Sitting	49
	Eye-Tragion Link	D20
36	Foot Breadth, Horizontal	50
37	Foot Length	51
38	Forearm-Center Of Grip Length	D17
39	Forearm Circumference, Flexed	52
40	Forearm-Forearm Breadth	53
41	Forearm-Hand Length	54
D17	Functional Grip Reach	D21
	Functional Grip Reach, Extended	D22
42	Functional Leg Length	
	Functional Leg Length	55
	Gluteal Furrow Height	56
43	Hand Breadth	57
44	Hand Circumference	58
45	Hand Length	59
46	Head Breadth	60
47	Head Circumference	61
48	Head Length	62
49	Heel-Ankle Circumference	63
50	Heel Breadth	64
51	Hip Breadth	65

TABLE F-1 Continued

MC-ANSUR Number	Dimension Name	ANSUR Number
52	Hip Breadth, Sitting	66
53	Iliocristale Height	67
D18	Index Finger Reach	D23
	Index Finger Reach, Extended	D24
54	Interpupillary Breadth	68
55	Interscye I	69
56	Interscye II	70
	Knee Circumference	71
57	Knee Height, Midpatella	72
58	Knee Height, Sitting	73
59	Lateral Femoral Epicondyle Height	74
60	Lateral Malleolus Height	75
61	Lower Thigh Circumference	76
62	Menton-Sellion Length	77
	Midshoulder Height, Sitting	78
	Neck-Bustpoint/Thelion Length	79
D19	Neck-Buttock Length	D26
	Neck-Gluteal Furrow Length	D27
63	Neck Circumference	80
64	Neck Circumference Base	81
	Neck Height, Lateral	82
D20	Neck Link	D25
D21	Neck-Scye Length	D28
	Overhead Fingertip Reach	83
	Overhead Fingertip Reach, Extended	84
65	Overhead Fingertip Reach, Sitting	85
66	Palm Length	
D22	Pelvic Link	D29
67	Popliteal Height	86
68	Radiale-Stylian Length	87
	Rise (Natural Indentation)	D30
D23	Rise (Omphalion)	D31
	Scye Circumference	88
	Scye Depth	89
69	Shoulder Circumference	
	Shoulder Circumference	90
70	Shoulder-Elbow Length	91
71	Shoulder Length	92

TABLE F-1 Continued

MC-ANSUR Number	Dimension Name	ANSUR Number
	Shoulder Slope	D32
	Shoulder-Waist Length (Natural Indentation)	D33
D24	Shoulder-Waist Length (Omphalion)	D34
72	Sitting Height	93
D25	Sleeve Inseam	D35
	Sleeve Length: Spine-Elbow	94
	Sleeve Length: Spine-Scye	95
73	Sleeve Length: Spine-Wrist	96
74	Sleeve Outseam	97
75	Span	98
76	Stature	99
	Strap Length	100
77	Suprasternale Height	101
D26	Suprasternale Height, Sitting	D36
D27	Suprasternale-Tenth Rib Length	
D28	Suprasternale-Waist Length (Omphalion)	
78	Tenth Rib Height	102
79	Thigh Circumference	103
80	Thigh Clearance	104
D29	Thigh Link	D37
D30	Thorax Link	D38
	Thumb Breadth	105
81	Thumbtip Reach	106
	Thumbtip Reach, Extended	D39
82	Tibial Height	
D31	Tragion Height	D40
D32	Tragion Height, Sitting	D41
83	Tragion-Top Of Head	H44
84	Trochanterion Height	107
D33	Vertical Grip Reach	D42
D34	Vertical Grip Reach Down	D43
	Vertical Grip Reach, Extended	D44
D35	Vertical Grip Reach, Sitting	D45
D36	Vertical Index Fingertip Reach	D46
	Vertical Index Fingertip Reach Down	D47
	Vertical Index Fingertip Reach, Extended	D48
D37	Vertical Index Fingertip Reach, Sitting	D49
	Vertical Thumbtip Reach Down	D50

TABLE F-1 Continued

MC-ANSUR Number	Dimension Name	ANSUR Number
D38	Vertical Thumbtip Reach, Sitting	D51
	Vertical Trunk Circumference (ASCC)	108
85	Vertical Trunk Circumference (USA)	109
	Vertical Wrist Height	D52
	Vertical Wrist Height, Extended	D53
	Vertical Wrist Height, Sitting	D54
	Waist Back Length (Natural Indentation)	110
86	Waist Back Length (Omphalion)	
	Waist Back Length (Omphalion)	111
	Waist Back, Vertical (Natural Indentation)	D55
D39	Waist Back, Vertical (Omphalion)	
	Waist Back, Vertical (Omphalion)	D56
87	Waist Breadth	112
	Waist-Buttock Drop (Natural Indentation)	D57
D40	Waist-Buttock Drop (Omphalion)	D58
	Waist Circumference (Natural Indentation)	113
88	Waist Circumference (Omphalion)	114
89	Waist Depth	115
	Waist Front Length (Natural Indentation)	116
	Waist Front Length (Omphalion)	117
90	Waist Front Length, Sitting	
	Waist Height (Natural Indentation)	118
91	Waist Height (Omphalion)	119
	Waist Height, Sitting (Natural Indentation)	120
	Waist Height, Sitting (Omphalion)	121
	Waist-Hip Length	122
	Waist (Natural Indentation)-Waist (Omphalion) Length	123
	Waist-Waist (Natural Indentation) Over Shoulder	D59
D41	Waist-Waist (Omphalion) Over Shoulder	D60
92	Weight	124
	Wrist-Center of Grip Length	125
93	Wrist Circumference	126
94	Wrist Height	127
	Wrist Height, Sitting	128
	Wrist-Index Finger Length	129
	Wrist-Thumbtip Length	130
	Wrist-Wall Length	131
	Wrist-Wall Length, Extended	132

APPENDIX G

COMPARABILITY OF MC-ANSUR DIMENSIONS WITH DIMENSIONS OF OTHER LARGE-SCALE SURVEYS

The primary objective of this appendix is to document the comparability of MC-ANSUR dimensions with like or similarly named dimensions measured in other large-scale anthropometric surveys. Data from surveys are frequently used to compare body size distributions among and between populations (e.g., males and females, occupational groups, racial groups, age categories). A particularly vexing problem in drawing conclusions from such comparisons is whether differences between the data reflect real population differences or are the result of using different techniques to measure what may be described or named as the same dimension. Differences in landmark definitions, subject positioning, instruments, and measuring techniques can and do lead to significantly different results.

It is particularly important that the body-size comparability among U.S. military populations be known. Items of personal-protective equipment, clothing, and weapon systems are sometimes designed to be used by more than one U.S. military service and/or by allied services in other countries. In recent years, design for commonality of use among North Atlantic Treaty Organization (NATO) services has received increased emphasis. This kind of cooperative effort requires knowledge of population distributions of dimensions, which form the basis for sizing, procurement, and issue of protective equipment, and determination of the comparability of persons who may be called upon to use often-restrictive workspaces, as in the case of pilots from one country undergoing training in another nation's aircraft.

Dimensions measured in MC-ANSUR are compared to like or similarly named dimensions measured in eight earlier U.S. and two foreign military surveys and two civilian surveys. Data from the earlier military surveys serve as the basis for the design of current equipment, clothing, and systems. Many of these, of course, will remain in military inventories for some time. The following means were used to judge the comparability of MC-ANSUR dimensions to other survey dimensions:

1. published descriptions of the dimensions and how they were measured.
2. published definitions of the landmarks used.
3. examination of summary statistics.
4. a comparability table published in the ANSUR final report (Gordon et al., 1989).

Table G-1 presents the authors' judgments about the comparability of the MC-ANSUR data to data from the other surveys listed. The following codes are used:

C - COMPARABLE – The landmarks and measuring techniques used are of such comparability that differences between data from surveys can be considered to reflect real anthropometric differences between populations.

PC - PROBABLY COMPARABLE – Differences in landmark definitions and/or

measuring techniques are of insufficient magnitude to make the resulting data inappropriate to use for most human engineering purposes such as the sizing, design, procurement, and issuing of military equipment or assessing the suitability of assigning personnel to restrictive workspaces.

NC - NOT COMPARABLE – Landmark differences and measuring techniques are believed to be different enough so that dimensions so coded should not be used as the basis for answering any population comparison questions.

CU - COMPARABILITY UNKNOWN – Several dimensions that are listed as CU were determined in other surveys by means other than direct measurement. Data from other dimensions coded CU reflect discrepancies for which no explanation is readily apparent.

The comparability between derived dimensions in MC-ANSUR and like dimensions measured directly in other surveys is, and will remain, unknown without extensive analyses. Therefore, derived dimensions do not appear in this table.

TABLE G-1

MC-ANSUR Dimensions: Assessment of Comparability with Other Surveys

Dimension	USN 1964 (Gifford et al., 1965)	USA 1966 (White and Churchill, 1971)	USA 1970 (Churchill et al., 1971)	USAF 1967 (Churchill et al., 1977)	RAF 2000 (Bolton et al., 1973)	CF (McCann et al., 1975)	USAF 1968 Women (Clauser et al., 1972)	USA 1977 Women (Churchill et al., 1977)	ANSUR 1988 (Gordon et al., 1989)	USMC 1994 (Donelson and Gordon, 1996)	NHANES (CDC, 2012)	CAESAR (Blackwell et al., 2002)
Abdominal Ext Depth, Sit					NC			C	C			
Acromial Height		NC	PC	PC			PC	PC	C		PC	
Acromion-Radiale Length				PC			PC	PC	C			
Acromion-Wall Depth												
Ankle Circumference	C	C	C	C	C		C	C	C			NC
Axilla Height					NC			C	C			
Ball of Foot Circumference		PC	C	C	NC			C	C			
Ball of Foot Length		C	C	C				C	C			
Biacromial Breadth	NC	NC	NC	NC	NC	NC	NC	NC	C			NC
Biceps Circumference, Flexed	C	C	C	C	C	C	C	C	C			
Bicristal Breadth	PC			PC			PC					
Bideltoid Breadth		C	C	C		C	C	C	C			C
Bimalleolar Breadth				C								
Bitragion Chin Arc									C			
Bitragion Submandibular Arc	C			C				C	C			

TABLE G-1 Continued

Dimension	USN 1964 (Gifford et al., 1965)	USA 1966 (White and Churchill, 1971)	USA 1970 (Churchill et al., 1971)	USAF 1967 (Churchill et al., 1977)	RAF 2000 (Bolton et al., 1973)	CF (McCann et al., 1975)	USAF 1968 Women (Clauser et al., 1972)	USA 1977 Women (Churchill et al., 1977)	ANSUR 1988 (Gordon et al., 1989)	USMC 1994 (Donelson and Gordon, 1996)	NHANES (CDC, 2012)	CAESAR (Blackwell et al., 2002)
Bizygomatic Breadth	PC	C	C	C		C	C	C	C			C
Buttock Circumference	C	C	C	C	C	C		C	C	C		NC
Buttock Depth	C			C			C					
Buttock Height				C			C	C	NC			C
Buttock-Knee Length	NC	NC	NC	NC	NC		NC	NC	C			PC
Buttock-Popliteal Length	NC	NC	NC	NC		NC	NC	NC	C			
Calf Circumference	C	C	C	C	C		C	C	C		NC	
Cervicale Height	NC	NC	NC	NC			C	C	C			
Chest Breadth	PC	PC	PC	PC			PC	PC	NC			
Chest Circumference	PC	PC	PC	PC	PC	PC	PC	PC	C	C		NC
Chest Depth	PC	PC	PC	PC			PC	PC	PC			
Chest Height	CU			CU			CU	CU	PC			
Crotch Height	PC	PC	PC	PC	PC	PC	PC	PC	C			NC
Crotch Length (Omphalion)				NC					C			NC
Crotch Length, Post (Omph)									C			
Ear Breadth	C			C			C	C	C			
Ear Length	C			C			C	C	C			
Ear Protrusion				NC					C			
Elbow Rest Height	PC		PC	PC	PC				C			C
Eye Height, Sitting	C	C	C	C			C	C	C			C
Foot Breadth, Horizontal	C	C	C	C	PC	C	C	C	C	C		
Foot Length	C	C	C	C	PC	C	C	C	C	C		PC
Forearm-Center of Grip Length									PC			
Forearm Circ, Flexed	PC	PC	PC	C			C	PC	C			
Forearm-Forearm Breadth				C					C			
Forearm Hand Length	C	C	C		C			C	C			
Functional Leg Length			NC		NC			NC	C			
Hand Breadth	C	C	C	C		C	C	C	C			
Hand Circumference	C	C	C	C			C	C	C			PC
Hand Length	PC	PC	PC	C		PC	C	CU	C			PC

TABLE G-1 Continued

Dimension	USN 1964 (Gifford et al., 1965)	USA 1966 (White and Churchill, 1971)	USA 1970 (Churchill et al., 1971)	USAF 1967 (Churchill et al., 1977)	RAF 2000 (Bolton et al., 1973)	CF (McCann et al., 1975)	USAF 1968 Women (Clauser et al., 1972)	USA 1977 Women (Churchill et al., 1977)	ANSUR 1988 (Gordon et al., 1989)	USMC 1994 (Donelson and Gordon, 1996)	NHANES (CDC, 2012)	CAESAR (Blackwell et al., 2002)
Head Breadth	C	C	C	C	C	C	C	C	C			C
Head Circumference	C	C	C	C	NC	NC	C	C	C	C		PC
Head Length	C	C	C	C	C		C	C	C			C
Heel-Ankle Circumference		C	C	C	NC			C	C			
Heel Breadth		CU	NC					PC	C			
Hip Breadth	PC	PC	PC	PC			PC	PC	C			
Hip Breadth, Sitting	CU	C	NC	NC			NC	C	C			C
Iliocristale Height		C		PC					C			
Interpupillary Breadth	NC	NC	NC	NC				NC	C			
Interscye I	C	C	C	NC			C	NC	C			
Interscye II								PC	C			
Knee Height, Midpatella				PC					C			
Knee Height, Sitting	CU	CU	NC	C	NC			NC	C			C
Lateral Fem Epicondyle Height									C			
Lateral Malleolus Height				PC			CU		C			
Lower Thigh Circumference	PC	PC	PC						C			
Menton-Sellion Length		C	NC	C		C	NC	NC	C	C		C
Neck Circumference	C	C	C	NC	C	NC			C			
Neck Circumference, Base									C	NC	NC	NC
Overhead Fingertip Reach, Sit		NC	C					PC	PC			
Palm Length									CU			
Popliteal Height	NC	NC	NC	NC			NC	NC	C			
Radiale-Stylian Length				C			C	C	C			
Shoulder Circumference	C	C	C	C			C	C	PC			
Shoulder-Elbow Length	NC	PC	PC	NC				PC	C			
Shoulder Length	NC	NC	NC	NC			NC	NC	C			
Sitting Height	C	C	C	C	NC		C	C	C	C		C
Sleeve Length: Spine-Wrist	C	NC	C	NC		C	PC		C			NC
Sleeve Outseam							NC		C	C		
Span						C			C			
Stature	C	C	C	C	NC	C	C	C	C	C	PC	PC
Suprasternale Height	C			C			C	C	C			
Tenth Rib Height									C			
Thigh Circumference	C	C	C	C	C		C	C	C		NC	NC
Thigh Clearance			NC	C	CU		NC	PC	C			

TABLE G-1 Continued

Dimension	USN 1964 (Gifford et al., 1965)	USA 1966 (White and Churchill, 1971)	USA 1970 (Churchill et al., 1971)	USAF 1967 (Churchill et al., 1977)	RAF 2000 (Bolton et al., 1973)	CF (McCann et al., 1975)	USAF 1968 Women (Clauser et al., 1972)	USA 1977 Women (Churchill et al., 1977)	ANSUR 1988 (Gordon et al., 1989)	USMC 1994 (Donelson and Gordon, 1996)	NHANES (CDC, 2012)	CAESAR (Blackwell et al., 2002)
Thumbtip Reach	PC	PC	PC	PC	PC	PC	PC	PC	C			PC
Tibial Height												
Tragion-Top of Head	PC	PC	PC	PC	PC		PC	CU	PC			
Trochanterion Height				C			NC	C	C			
Vertical Trunk Circ (USA)	NC	PC	NC	NC		C	PC	PC	C			
Waist Back Length (Omph)		CU	CU	CU					C			
Waist Breadth	NC			C			NC	NC	C			
Waist Circumference (Omph)		C	C	C		C			C	C	NC	
Waist Depth	NC			C			NC	NC	C			
Waist Front Length, Sitting				NC								
Waist Height (Omphalion)		C	C	C					C	C		
Weight	C	C	C	C	C	C	C	C	C	C	C	C
Wrist Circumference	NC	NC	NC	C	C		C	C	C			
Wrist Height				C					C			

REFERENCES*

Blackwell S, Robinette KM, Boehmer M, Fleming S, Kelly S, Brill T, Hoeflerlin D, Burnsides D, Daanen H (2002) *Civilian American and European Surface Anthropometry Resource (CAESAR), Final Report, Volume II: Descriptions*. Technical Report AFRL-HE-WP-TR-2002-0173, Human Effectiveness Directorate, Crew Systems Interface Division, Wright-Patterson Air Force Base, OH.

Bolton CB, Kenward M, Simpson RE, Turner GM (1973) *An Anthropometric Survey of 2000 Royal Air Force Aircrew 1970/1971*. Technical Report 73083, Royal Air Force Establishment, Farnborough, Hants, England.

* The references for this appendix are included here for ease of use, but are also included in the main References section.

Centers for Disease Control and Prevention (CDC) 2012 National Center for Health Statistics (NCHS). *National Health and Nutrition Examination Survey Examination Protocol*. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

http://www.cdc.gov/nchs/data/nhanes/nhanes_09_10/BodyMeasures_09.pdf.

Churchill E, Churchill T, McConville JT, White RM (1977) *Anthropometry of Women of the U.S. Army--1977: Report No. 2 - The Basic Univariate Statistics*. Technical Report NATICK-TR-77/024 (AD A044 806). U.S. Army Natick Research and Development Command, Natick, MA.

Churchill E, Kikta P, Churchill T (1977) *The AMRL Anthropometric Data Bank Library: Volumes I-V*. Technical Report AMRL-TR-77-1(AD A047 314). Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, OH.

Churchill E, McConville JT, Laubach LL, White RM (1971) *Anthropometry of U.S. Army Aviators - 1970*. Technical Report TR-72-52-CE (AD 743528). U.S. Army Natick Laboratories, Natick, MA.

Clauser CE, Tucker PE, McConville JT, Churchill E, Laubach L, Reardon J (1972) *Anthropometry of Air Force Women*. Technical Report AMRL-TR-70-5 (AD 743 113). Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, OH.

Donelson SM, Gordon CC (1996) *Validation of a Statistical Matching Procedure Used to Create United States Marine Corps Anthropometric Databases*. Technical Report (TR-96-035) (ADA316645). U.S. Army Natick Research, Development and Engineering Center, Natick, MA.

Gifford EC, Provost JR, Lazo J (1965) *Anthropometry of Naval Aviators - 1964*. Aerospace Crew Equipment Laboratory Report No. NAEC ACEL 533. U.S. Naval Air Engineering Center, Philadelphia, PA.

Gordon CC, Bradtmiller B, Clauser CE, Churchill T, McConville JT, Tebbetts I, Walker RA (1989) *1987-1988 Anthropometric Survey of U.S. Army Personnel: Methods and Summary Statistics*. Technical Report (TR-89-044) (ADA225 094). U.S. Army Natick Research, Development and Engineering Center, Natick, MA.

McCann C, Noy I, Rodden E, Logan O (1975) *1974 Anthropometric Survey of Canadian Forces Personnel*. DCIEM Report No. 75-R-1114. Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada.

White RM, Churchill E (1971) *The Body Size of Soldiers*. U.S. Army Anthropometry - 1666. Technical Report 72-51-CE (AD 743 465). U.S. Army Natick Laboratories, Natick, MA.

APPENDIX H

DEMOGRAPHIC/BIOGRAPHICAL FORM (Reprint of original)

USMC Anthropometric Survey (MC-ANSUR)
Natick Soldier Research, Development & Engineering Center
Biographical Questionnaire

Thank-you for helping to update the USMC's anthropometric database.

INSTRUCTIONS:

Please respond to the questions on the following pages by completely filling in the bubble that corresponds with your answer. Please do not use checkmarks or Xs.

Marking Instructions	
Use a No. 2 pencil, only. Do not use ink, ballpoint pen, or felt tip pens.	
Make solid marks that fill the response completely.	
Erase cleanly any marks that you want to change.	
Make any write-in responses on the lines or boxes provided.	
Correct: ●	Incorrect: ✓ ✗ ◐ ◑

1. Last Name: _____ First Name: _____

2. What is your gender? ☐ Male ☐ Female

3. What is your current rank / grade?

Enlisted	Warrant Officer	Officer
① Pvt	① WO	① 2nd Lt
② PFC	② CW02	② 1st Lt
③ LCpl	③ CW03	③ Capt
④ Cpl	④ CW04	④ Maj
⑤ Sgt	⑤ CW05	⑤ LtCol
⑥ SSgt		⑥ Col
⑦ GySgt		⑦ BGen
⑧ MSgt		⑧ MajGen
⑨ 1stSgt		⑨ LtGen
⑩ MGySgt		⑩ Gen
⑪ SgtMaj		
⑫ SgtMaj MC		

4. Today's date: (mm/dd/yyyy) ____ / ____ / ____

5. Installation: _____
6. Component: ☐ Regular USMC ☐ USMC Reserve
7. Element you are in:
- ☐ Command Element (CE) ☐ Aviation Combat Element (ACE)
- ☐ Ground Combat Element (GCE) ☐ Logistics Combat Element (LCE)
8. Please identify your unit: (ex, 1st Battalion First Marines, 9th Comm Battalion)
- _____
9. Please identify your primary MOS: (ex: 03 field 0311 Basic Infantryman, etc)
- _____
10. Please identify the state, territory, foreign country or military installation where you were born. _____
11. Your Population Subgroup: (please mark all that apply)
- ☐ White, not of Hispanic Origin
- ☐ Black, not of Hispanic Origin
- ☐ Hispanic (please mark all that apply)
- ☐ Mexican ☐ Latin American: _____
- ☐ Puerto Rican ☐ Other Hispanic: _____
- ☐ Cuban
- ☐ Asian or Pacific Islander (please mark all that apply)
- ☐ Chinese ☐ Japanese ☐ Korean
- ☐ Vietnamese ☐ Filipino ☐ Samoan
- ☐ Guamanian/Chamorro ☐ Melanesian ☐ Micronesian
- ☐ Polynesian ☐ Other Pacific Islander: _____
- ☐ Other Asian: _____
- ☐ Native American (please mark all that apply)
- ☐ Eskimo ☐ Aleut ☐ U.S./Canadian Tribe(s): _____
- ☐ Other (please mark all that apply)
- ☐ East/ Asian Indian ☐ Arab or Middle Eastern
- ☐ Caribbean Islander ☐ Other: _____

12. Please identify the state, territory, foreign country or military installation where your MOTHER was born in. _____

13. Your MOTHER'S Population Subgroup. (Please mark all that apply.)

- ☐ White, not of Hispanic Origin
- ☐ Black, not of Hispanic Origin
- ☐ Hispanic (please specify) _____
- ☐ Asian or Pacific Islander (please specify) _____
- ☐ Native American (please specify) _____
- ☐ Other (please specify) _____
- ☐ Don't know

14. Please identify the state, territory, foreign country or military installation where your FATHER was born. _____

15. Your FATHER'S Population Subgroup. (Please mark all that apply.)

- ☐ White, not of Hispanic Origin
- ☐ Black, not of Hispanic Origin
- ☐ Hispanic (please specify) _____
- ☐ Asian or Pacific Islander (please specify) _____
- ☐ Native American (please specify) _____
- ☐ Other (please specify) _____
- ☐ Don't know

16. When did you return from your last deployment?

- ☐ Never deployed
- ☐ Less than 1 month ago
- ☐ 1-3 months ago
- ☐ 4-6 months ago
- ☐ 7-12 months ago
- ☐ More than 1 year ago

17. Where were you last deployed?

- ☐ Iraq
- ☐ Other _____
- ☐ Afghanistan
- ☐ N/A (I have never deployed)

18. Are you scheduled for deployment in the near future?

- ☐ Not scheduled
- ☐ Less than 6 months from now
- ☐ More than 6 months from now
- ☐ Don't know

Continued on other side...

Write-in answers to the following questions on the lines provided.

Fill in the bubbles below each question to correspond to the numbers you enter on the line.

For numbers which are only 1 digit, fill in a zero in the first column. (See example)

EXAMPLE									
<u>6</u> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">●</div> <div style="text-align: center;">(0)</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">(1) (1)</div> <div style="text-align: center;">(2) (2)</div> <div style="text-align: center;">(3) (3)</div> <div style="text-align: center;">(4) (4)</div> <div style="text-align: center;">(5) (5)</div> <div style="text-align: center;">(6) ●</div> <div style="text-align: center;">(7) (7)</div> <div style="text-align: center;">(8) (8)</div> <div style="text-align: center;">(9) (9)</div> </div>		19. Age _____ <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">(0) (0)</div> <div style="text-align: center;">(1) (1)</div> <div style="text-align: center;">(2) (2)</div> <div style="text-align: center;">(3) (3)</div> <div style="text-align: center;">(4) (4)</div> <div style="text-align: center;">(5) (5)</div> <div style="text-align: center;">(6) (6)</div> <div style="text-align: center;">(7) (7)</div> <div style="text-align: center;">(8) (8)</div> <div style="text-align: center;">(9) (9)</div> </div>		20. Birthdate: <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> Month (mm) _____ <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">(0) (0)</div> <div style="text-align: center;">(1) (1)</div> <div style="text-align: center;">(2) (2)</div> <div style="text-align: center;">(3) (3)</div> <div style="text-align: center;">(4) (4)</div> <div style="text-align: center;">(5) (5)</div> <div style="text-align: center;">(6) (6)</div> <div style="text-align: center;">(7) (7)</div> <div style="text-align: center;">(8) (8)</div> <div style="text-align: center;">(9) (9)</div> </div> </div> <div style="width: 30%;"> Day (dd) _____ <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">(0) (0)</div> <div style="text-align: center;">(1) (1)</div> <div style="text-align: center;">(2) (2)</div> <div style="text-align: center;">(3) (3)</div> <div style="text-align: center;">(4) (4)</div> <div style="text-align: center;">(5) (5)</div> <div style="text-align: center;">(6) (6)</div> <div style="text-align: center;">(7) (7)</div> <div style="text-align: center;">(8) (8)</div> <div style="text-align: center;">(9) (9)</div> </div> </div> <div style="width: 30%;"> Year (yy) _____ <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">(0) (0)</div> <div style="text-align: center;">(1) (1)</div> <div style="text-align: center;">(2) (2)</div> <div style="text-align: center;">(3) (3)</div> <div style="text-align: center;">(4) (4)</div> <div style="text-align: center;">(5) (5)</div> <div style="text-align: center;">(6) (6)</div> <div style="text-align: center;">(7) (7)</div> <div style="text-align: center;">(8) (8)</div> <div style="text-align: center;">(9) (9)</div> </div> </div> </div>					
21. Height: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Feet _____ <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">(0)</div> <div style="text-align: center;">(1)</div> <div style="text-align: center;">(2)</div> <div style="text-align: center;">(3)</div> <div style="text-align: center;">(4)</div> <div style="text-align: center;">(5)</div> <div style="text-align: center;">(6)</div> <div style="text-align: center;">(7)</div> <div style="text-align: center;">(8)</div> <div style="text-align: center;">(9)</div> </div> </div> <div style="width: 45%;"> Inches _____ <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">(0) (0)</div> <div style="text-align: center;">(1) (1)</div> <div style="text-align: center;">(2) (2)</div> <div style="text-align: center;">(3) (3)</div> <div style="text-align: center;">(4) (4)</div> <div style="text-align: center;">(5) (5)</div> <div style="text-align: center;">(6) (6)</div> <div style="text-align: center;">(7) (7)</div> <div style="text-align: center;">(8) (8)</div> <div style="text-align: center;">(9) (9)</div> </div> </div> </div>		22. Weight: <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">(0) (0) (0)</div> <div style="text-align: center;">(1) (1) (1)</div> <div style="text-align: center;">(2) (2) (2)</div> <div style="text-align: center;">(3) (3) (3)</div> <div style="text-align: center;">(4) (4) (4)</div> <div style="text-align: center;">(5) (5) (5)</div> <div style="text-align: center;">(6) (6) (6)</div> <div style="text-align: center;">(7) (7) (7)</div> <div style="text-align: center;">(8) (8) (8)</div> <div style="text-align: center;">(9) (9) (9)</div> </div>							

23. Writing preference:

☐ Right hand

☐ Left hand

☐ Either hand (no preference)

Please do not write in the area below this line



APPENDIX I

GLOSSARY OF ANATOMICAL AND ANTHROPOMETRIC TERMS

acromion - tip of the shoulder

acromial process - an oblong portion of the shoulder blade at the top of the shoulder

anatomical position - a standard position of the body to which all anatomical directions (e.g., superior, medial, anterior) are referenced (see Figure I-1)

anterior - pertaining to the front of the body; to the opposite of posterior

axilla - armpit

bi - a prefix denoting connection with or relation to each of two symmetrically paired parts

biceps - used to refer to the two heads of a muscle; the term is most commonly used to refer to the large muscle on the anterior surface of the upper arm (biceps brachii).

canthus - a corner or angle formed by the meeting of the eyelids

coronal plane - any vertical plane at right angles to the midsagittal plane; divides the body into anterior and posterior divisions (see Figure I-1)

deltoid muscle - the muscle that forms the flesh of the lateral side of the upper third of the upper arm

distal - farther from the trunk of the body, as opposed to proximal (see Figure I-1)

dorsal - pertaining to the back of the body or one of its parts [on the hand, its top surface as opposed to its palmar surface and on the foot, its top surface as opposed to its plantar (bottom) surface].

epicondyle - the bony prominence at the distal end of the humerus and femur (bones)

extend - to move adjacent segments of a limb so that the angle between them is increased, as when the leg is straightened; as opposed to flex

femoral epicondyle - the bony projections on either side of the distal end of the femur

femur - the thigh bone

flex - to move adjacent segments of a limb in such a direction as to bring the two parts together, as when the elbow is bent; as opposed to extend

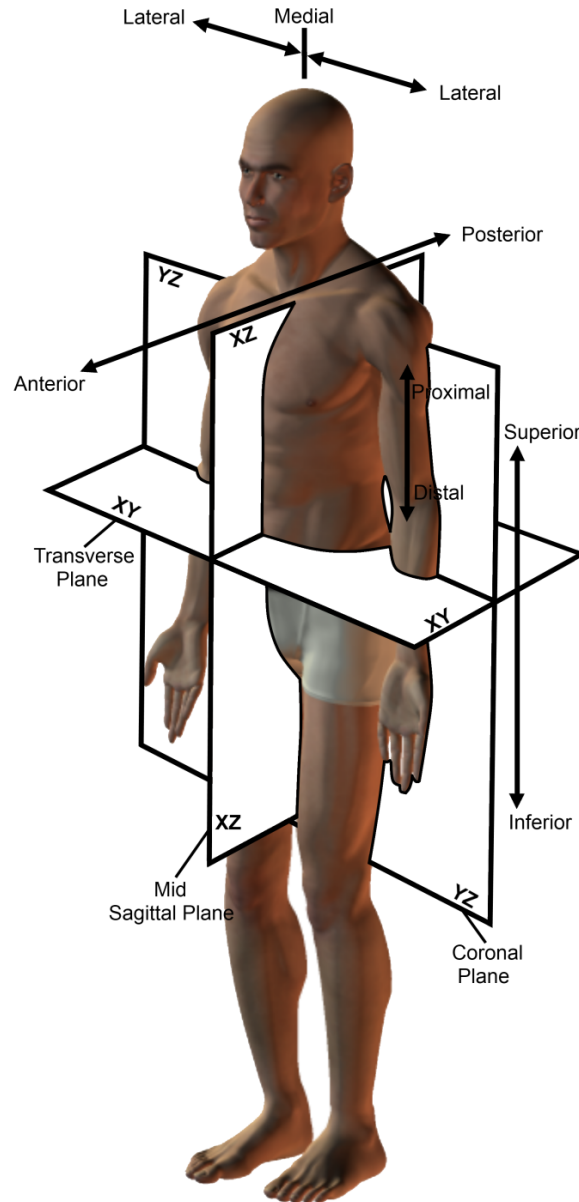


FIGURE I-1

Anatomical Position and Terminology

Frankfurt plane - the standard horizontal plane orientation of the head; the plane is established by a line passing through the right tragon (approximate earhole) and the lowest point of the right orbitale (eye socket)

gluteal furrow - the crease at the juncture of the buttock and the thigh

hyperextend - to overextend a limb or other part of the body

iliac - pertaining to the ilium, one of the three fused bones that form one side of the pelvis

iliac crest - the superior rim of the ilium

inferior - below, in relation to another structure; lower (see Figure I-1)

lateral - away from the midline of the body; as opposed to medial (see Figure I-1)

malleoli - rounded bony projection on either side of the ankle; the lateral malleolus, on the outside of the ankle, is at the distal end of the fibula (one of the two bones of the calf); the medial malleolus, on the inside of the ankle, is at the distal end of the tibia (the shin bone)

mandible - the lower jawbone

mastoid process - lowest bony projection behind and below the ear—best felt immediately behind the earlobe

medial - lying near or toward the midline of the body; as opposed to lateral (see Figure I-1)

metacarpophalangeal joint - a joint (knuckle) formed by the juncture of a finger bone (phalanx) with the palm bone (metacarpal)

metatarsophalangeal joint - a joint formed by the juncture of a toe bone (phalanx) with the foot bone (metatarsal)

midsagittal - the vertical plane that divides the body into equal right and left halves (see Figure I-1)

olecranon - the proximal end of the ulna (the elbow)

omphalion - the navel

palmar - pertaining to the palm side of the hand; as opposed to its dorsal surface

patella - the kneecap

phalanx - a finger or toe bone

popliteal fossa - dorsal juncture of the calf and thigh; back of the knee

posterior - pertaining to the back of the body; as opposed to anterior (see Figure I-1)

proximal - closer to the trunk of the body; as opposed to distal (see Figure I-1)

radius - the bone of the forearm on the thumb side of the arm

scye - a tailoring term referring to the armhole of a garment

sternum - the breast bone

stylion - the lowest point at the bottom of the radius (bone)

superior - above, in relation to another structure (see Figure I-1)

supra - prefix designating above or on

supraorbital ridges - the brow ridges above the eye sockets at the bottom of the forehead

thelion - the center of the nipple on men

tibia - the shin bone

tragion - the juncture of the top of the cartilaginous flap of the ear with the head

tragus - the cartilaginous flap of the ear near the earhole

trapezius - the large muscle that originates on the neck and the upper half of the back and converges on the shoulder between midshoulder and acromion

trochanter - a point in the center of the lateral side of the large prominence at the top of the thigh bone (femur), located on a sitting subject

ventral - the front or inside surface

vertebra - a bone of the spine; in humans there are 7 cervical (neck), 12 thoracic (chest), 5 lumbar (lower back), 5 sacral (fused), and 4 caudal (tail) vertebrae

zygomatic arch - the bony arch below and to the side of the orbit of the skull extending horizontally along the side of the head from the cheekbone (the zygomatic bone) nearly to the external ear

zygomatic bone - a bone of the face underlying the upper part of the cheek